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REPORTS

FROM

COMMITTEES:

EIGHT VOLUMES.

—(2.)—

AGRICULTURAL STATISTICS;
ADULTERATION OF FOOD, &c.;
LUNATIC ASYLUMS (IRELAND) (ADVANCES) BILL.

Session

12 *December* 1854 —— 14 *August* 1855.

VOL. VIII.

1854-5.

REPORTS FROM COMMITTEES:

1854-5.

EIGHT VOLUMES:—CONTENTS OF THE

SECOND VOLUME.

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Brought from the Lords, 9 August 1855.

REPORT

FROM THE

SELECT COMMITTEE OF THE HOUSE OF LORDS,

APPOINTED TO INQUIRE INTO

The best Mode of obtaining accurate AGRICULTURAL STATISTICS from all Parts of the United Kingdom;

AND TO REPORT THEREON TO THE HOUSE;

TOGETHER WITH THE

MINUTES OF EVIDENCE,

APPENDIX AND INDEX.

Session 1855.

Ordered, by The House of Commons, *to be Printed,*
10 *August* 1855.

NAMES OF THE LORDS PRESENT AT EACH SITTING OF THE COMMITTEE.

Die Jovis, 14° *Junii* 1855.

Earl Doncaster.
Earl Carnarvon.
Earl Burlington.
Lord Berners.
Lord Lovel and Holland.
Lord Colchester.
Lord Portman.
Lord Stanley of Alderley.

Die Martis, 19° *Junii* 1855.

Earl Doncaster.
Earl Carnarvon.
Earl Harrowby.
Earl Stradbroke.
Earl Burlington.
Lord Berners.
Lord Lovel and Holland.
Lord Colchester.
Lord Portman.
Lord Stanley of Alderley.
Lord Monteagle of Brandon.

Die Jovis, 21° *Junii* 1855.

Earl Doncaster.
Earl Carnarvon.
Earl Stradbroke.
Earl Burlington.
Lord Berners.
Lord Lovel and Holland.
Lord Mont Eagle.
Lord Colchester.
Lord Stanley of Alderley.

Die Veneris, 22° *Junii* 1855.

Lord Privy Seal.
Earl Doncaster.
Earl Carnarvon.
Earl Harrowby.
Earl Stradbroke.
Earl Burlington.
Lord Berners.
Lord Lovel and Holland.
Lord Mont Eagle.
Lord Colchester.
Lord Portman.
Lord Stanley of Alderley.
Lord Monteagle of Brandon.

Die Lunæ, 25° *Junii* 1855.

Earl Doncaster.
Earl Harrowby.
Earl Stradbroke.
Earl Burlington.
Lord Berners.
Lord Lovel and Holland.
Lord Mont Eagle.
Lord Colchester.
Lord Portman.
Lord Stanley of Alderley.

Die Jovis, 28° *Junii* 1855.

Earl Doncaster.
Earl Carnarvon.
Earl Harrowby.
Earl Stradbroke.
Earl Burlington.
Lord Berners.
Lord Lovel and Holland.
Lord Mont Eagle.
Lord Colchester.
Lord Portman.
Lord Stanley of Alderley.

Die Veneris, 20° *Julii* 1855.

Earl Doncaster.
Earl Carnarvon.
Earl Harrowby.
Earl Stradbroke.
Earl Burlington.
Lord Berners.
Lord Colchester.
Lord Portman.
Lord Stanley of Alderley.

Die Lunæ, 23° *Julii* 1855.

Earl Doncaster.
Earl Carnarvon.
Earl Stradbroke.
Lord Lovel and Holland.
Lord Colchester.
Lord Portman.
Lord Stanley of Alderley.

REPORT.

BY THE LORDS COMMITTEES appointed a SELECT COMMITTEE to inquire into the best Mode of obtaining accurate AGRICULTURAL STATISTICS from all Parts of the United Kingdom, and to report thereon to The House :—

ORDERED TO REPORT,

THAT the Committee have met, and considered the subject-matter to them referred; and have examined several Witnesses in relation thereto; and have agreed to the following REPORT :—

The importance of obtaining accurate Returns of the Statistics of Agriculture in this country is now so generally admitted, that it appears to the Committee scarcely necessary to dwell upon it. The absence of information on the subject is found to be productive of inconvenience and injury to all classes—and to none more than to the agricultural interests themselves,—owing to the uncertainty which prevails as to the quantity of land under the different descriptions of cultivation in each year, as to the supplies of food that exist in the country at any given period, and, consequently, as to the quantities which may be required from abroad to make up the deficiency in home-grown produce, thus giving rise to extreme variations in the price of corn, and to the proverbially hazardous speculations of which this uncertainty is the main cause. The necessity of obtaining such information is further shown by the attempts periodically made by those interested in the corn trade to arrive, by means of carefully made experiments, at an approximate estimate of the results of the harvest in each year, and of the amount of corn available for the wants of the people. And it is not in these and other practical and every-day respects alone that the absence of trustworthy Agricultural Statistics is felt. They are indispensable as the basis on which a correct appreciation of the social and economical progress of a most important portion of the population must rest; and it may be expected, that when the conjectural and uncertain data which now guide our calculations in these respects are replaced by ascertained and undoubted facts, much light will be thrown upon many important questions connected with the well-being of the population, and the risk of error in dealing with them diminished.

Most of the leading Foreign States have long appreciated the advantages of agricultural statistics, and more or less perfectly organised systems for the purpose of collecting them systematically are in force in France, Holland, Belgium, the United States, and other countries. Various attempts have also been made at different times in this country to obtain the same results, the chief of which may be briefly enumerated.

So far back as 1831 an attempt was made by the Norfolk magistracy to collect the statistics of Norfolk. But although this experiment was conducted under favourable circumstances, only 426 persons out of the 680 who were applied to, returned any answer to the requests made to them for information.

In 1836 the Board of Trade attempted to obtain the Agricultural Statistics of the County of Bedford through the aid of the Clergy of its 126 parishes. Only 27, however, out of the whole number returned any answer whatever to

the circular that was sent to them, stating the objects of the Government in making the inquiry, and forwarding a blank form of the information desired.

In 1845, an experiment on a small scale was carried out simultaneously in England, Scotland, and Ireland. In the case of Ireland, the Bailieborough Union was selected, and the experiment, which was conducted by means of private agency, was entirely successful. In that of Scotland the Board of Trade selected the county of Midlothian, the machinery employed being the parish schoolmasters, and an equally satisfactory result was attained; while in England, where North Hants was made the field of the inquiry through the agency of the Boards of Guardians, the experiment ended in failure.

In 1847, a Bill was introduced by the Board of Trade into the House of Commons for the collection of the Agricultural Statistics of England and Wales by the Registrar-general's Department, through the medium of the Superintendent Registrars throughout the country. The Bill proposed that the latter should appoint agricultural enumerators in their respective districts, who were to make out lists of all occupiers of land therein exceeding three acres, and to send to them, on or before the 1st June in each year, the blank forms of schedule containing the required information, which were to be filled up and returned within 14 days. The enumerators were to classify and to tabulate them before their being returned to the Registrar-general through the Superintendant Registrar by the 10th July. The Board of Trade was to be empowered to alter the forms of the returns comprised in the schedules as experience might show to be advisable. Provision was made for the remuneration of the Enumerators and Superintendent Registrars employed, and for the imposition of penalties in case of neglect of duty on their part, or refusal to supply information on the part of the farmers.

This Bill, however, did not reach a second reading.

At that very time, however, the apprehension of an impending famine in Ireland, which was unhappily only too truly realised, led the executive in that country to attempt to obtain correct Irish returns, embracing not merely the extent of land under each kind of cultivation, but also the produce of the harvest. The Board of Works was intrusted with the organisation of the scheme, and the constabulary force was employed to carry out the details. The results obtained were laid before Parliament in the year 1848, and have since been regularly continued, with the recent substitution, however, of the Irish Registrar-general for the Board of Works as the superintendent of the inquiries.

In the meantime Scotland was not idle in the matter, a very successful attempt being made in 1849, by the East of Berwickshire Farmers' Club, to obtain the Agricultural Statistics of that county through the agency of the rural police: nearly every parish gave the information sought for, and the total expense incurred was not more than 5 *l.*

In 1853, the Highland Society having urged the Government to undertake the duty of collecting these statistics, the Board of Trade undertook the charge of an experiment, to be carried on simultaneously in England and Scotland on a larger scale than had been previously attempted, and had the advantage of securing the co-operation of the Poor-law Board in the former case, and of the Highland Society in the latter, the Treasury advancing the sum of 2,000 *l.* for the purpose. The English counties selected for the experiment were Norfolk and Hants, and the Scotch counties Haddington, Roxburgh, and Sutherland. The machinery employed in the collection of the returns, and the satisfactory results that were attained as a whole will be found fully described in the Reports on the subject laid before Parliament in the Session of 1854.

As respects the English experiment, a Poor-law Inspector superintended the conduct of the inquiry in each of the two counties, dividing it into its different unions, and making the Boards of Guardians, wherever practicable, the channel of communication, and in many instances finding them, or the statistical committees appointed by them, of invaluable service in removing the unwillingness of the farmers to give the returns, and in impressing the importance of the subject upon them. The enumerators employed to distribute the schedules, and to collect them again when filled up, in each parish of the union, were, as a general rule, the relieving officers of the parish; while the classifier, whose

whose duty it was to arrange the parochial schedules, and to tabulate and sum them up for final transmission to the Inspector as the union return, was the clerk to the Board of Guardians, in those cases where he was willing to act. Both enumerators and classifiers received a fixed rate of remuneration per 100 schedules returned by them.

The inquiry was confined to returns (embracing holdings of two acres and upwards) of the quantity of land under each description of crop, and of live stock, without its being attempted to obtain any estimate of produce. Under all the circumstances, the success attained was very remarkable, especially in the case of Norfolk, where, under the able management of Sir John Walsham, the failures were only 2 ¾ per cent. (400 out of 14,805 schedules), although there were three unions from which no satisfactory returns were made; while in that of Hants, which enjoyed the advantage of Mr. Hawley's services, they were 8 per cent. (693 out of 8,599 schedules); the average of the two being 4 ¾ per cent. It appears evident, from the satisfactory nature of these results, as compared with the results of previous experiments, that a great change has taken place in the feelings of the farmers of England on the subject; and that, as a general rule, they no longer view these statistics with that apprehension, and even in some instances hostility, with which they formerly regarded them. It is necessary to observe, that a perfect check as to the accuracy of the totals of acreage in the returns that were made existed in the parochial rate-books, which exhibit the extent of the holding of each individual.

In Scotland, a different machinery was employed, and with still greater success, by the Highland Society, which possesses the advantage of regular correspondence with local Societies in the various counties, whose influence with the farmers was of material assistance in inducing them to make the returns. An enumerator was appointed by the Society in each district, who was assisted by a local committee of farmers. The schedules were sent direct from the Society to the enumerators, who distributed them to the occupiers, and collected them again for transmission to Edinburgh, where they were tabulated and booked. An option was given to the farmers to send the returns direct to the Highland Society, by which means their contents would be kept secret from any persons who it was supposed might profit from the information in them, and any objection to giving that information removed. The required particulars were obtained in every single instance in the three counties, and with three exceptions only, by the voluntary act of the occupiers themselves. An estimate of produce was added in the Scotch case to the returns of acreage and stock, to which the English statistics were limited.

Out of the 2,000 *l.* authorized by the Treasury to be spent on the occasion, 900 *l.* was allocated to Scotland, and 1,100 *l.* to England; while the outlay actually incurred in the Scotch experiment proved not to exceed 667 *l.*, and the English outlay 850 *l.*, leaving nearly one-fourth of the original estimate unexpended.

These experiments, great as was the success that attended them, were scarcely conducted on a sufficiently extensive scale to give assurance (as respects England, at least) that complete returns might be at once obtained for the whole country; and a further and greatly enlarged experiment was accordingly undertaken in 1854, extending over 11 English and Welsh counties, at an estimated cost of 4,000 *l.*; whilst the Scotch inquiry, for which 6,000 *l.* was set apart, was simultaneously made to embrace the whole of Scotland, the machinery in both cases, viz., that of the Poor-law Board through the agency of its Inspectors in England, and the Highland Society in Scotland (with certain modifications in the details) remaining the same as in the experiment of 1853. The results obtained have been laid in detail before Parliament during the present Session, and the different reports that accompany them have been of much assistance to the Committee in considering the question referred to them.

The success of the inquiries has again been very great, though more unequal than before, the extent of failure in Scotland* having been less than one-fifth per

* The amount remaining unexpended out of the Scotch Vote of 6,000 *l.* is stated to be as much as 2,000 *l.*

per cent. (or 100 out of 50,000 schedules) owing in great measure to the indefatigable exertions of Mr. Hall Maxwell, the able secretary to the Highland Society; while in England it amounted, for the whole of the 11 counties, to about seven per cent. (8,128 schedules out of 118,287). But that amount of imperfect success is sufficiently great to make it evident that the means hitherto employed are inadequate, if left without modification, to secure that completeness of the returns which is indispensable to their practical utility.

The Committee have particularly directed their attention to the question of the best machinery to be employed in future, whether that machinery be the present one modified and improved, or an entirely new one; and many plans have been laid before them by the different witnesses, which will be found detailed in the Evidence appended to this Report.

The returns which the Committee consider it desirable to have embraced in any system for the collection of agricultural statistics throughout the United Kingdom are three in number; namely,

1. An accurate return of acreage under each description of crop.
2. An accurate return of stock.
3. An approximate estimate of the produce of the harvest.

Leaving out of consideration for the present the question of Scotland and Ireland, and confining their remarks to the case of England and Wales, the Committee would observe, that the machinery employed in the two former portions of the kingdom is, in their opinion, obviously inapplicable to the collection of the English statistics, as, with respect to them, there neither exists a Society whose influence and ramifications extend over the whole country in the peculiar manner of the Highland Society, nor a uniform system of police corresponding with the Irish constabulary. Taking into consideration the fact that the Poor-law machinery, worked in the manner already described, has now been employed in two successive inquiries, and that, without the aid of any legislative enactment, so large a measure of success as has been shown has been obtained under it, the Committee are of opinion that the existing machinery, under these circumstances, establishes a case for being employed for the future, (with such additions and improvements as experience has shown to be necessary), until some other machinery can be shown to be better adapted for the purpose. The Committee wish to give every credit to the ingenuity of the schemes that various witnesses have proposed to them as best adapted to attain the desired end; but they have not been satisfied that the balance of advantage is so decidedly in favour of any of them as to make it advisable to discard the mode of collection which has hitherto been tried with so considerable an amount of success, which meets with the entire approval of the only two gentlemen (Sir J. Walsham and Mr. Hawley) who have been engaged in the conduct of the inquiry in both years, and which the Committee believe may be so far improved, by means of the measures which they have to suggest, as to render it efficacious and well adapted for the object in view.

The first point to which the attention of the Committee has been strongly called is the necessity of rendering it compulsory on the occupiers of land to give the information sought for in the schedules sent to them; and it is satisfactory to state, that while it is admitted on all hands that complete returns cannot be obtained in England without compulsory powers, the witnesses who were examined on the subject were nearly unanimous in favour of obtaining compulsory powers, and were also agreed in opinion that the farmers, as a body, instead of objecting to the existence of such powers, would prefer a system obliging every one to make the returns to a voluntary system, under which their neighbours might decline to do so, while they themselves complied with the application made to them.

The Committee accordingly recommend that power should be given by Act of Parliament, enabling the Government to compel occupiers of land to fill up the schedules sent to them.

The Committee consider that, in the event of refusal, or in the case of making wilfully inaccurate or incomplete returns, the occupier should be obliged to pay

pay the expenses that may be incurred in obtaining an accurate return of the statistics of his holding, in the way that is provided by the County Rate Assessment Act.

The Committee think that the schedule to be introduced in any Bill that may be brought in on the subject of the collection of Agricultural Statistics should be sufficiently comprehensive, but that power should be given to the Board of Trade, or any other department of Government that may be entrusted with the superintendence of the collection, to omit or modify at discretion any particular columns of information.

The question of the details of the machinery to be employed may now be considered.

However valuable may have been the services rendered by the different Poor-law Inspectors in conducting the experimental inquiries of 1853 and 1854 in their respective localities, yet, looking at the arduous nature of their duties at all times, and the evidence received on the subject, the Committee do not recommend that the intervention of those officers should, as a general rule, be required in future. They propose that the necessary communications on the subject of the returns should be made direct by the Poor-law Board, on behalf of the Board of Trade, to the Boards of Guardians of the different unions of the country, and that the latter should be desired to appoint the enumerators to distribute and collect again the schedules for every parish of the union; and also a classifier for the union, who should arrange and tabulate the parish returns, and transmit the results for the whole union to the Poor-law Board. The clerk of the union should be the classifier, and the relieving officers the enumerators, unless there should be any special reasons to the contrary, when the Boards of Guardians should be at liberty to nominate such other persons as they may think fit to conduct the inquiry.

In those cases in which the Boards of Guardians might refuse their co-operation, the Poor-law Board should correspond direct with the clerk of the union in his individual capacity; but the Committee would be unwilling that the friendly assistance of such intelligent and influential local authorities as the Boards of Guardians generally are, should not be taken advantage of in those cases in which it may be obtained, while so simple a remedy exists in those in which they decline to assist.

It is important to observe, as a reason in favour of the employment of the Poor-law machinery, that the period of the year in which the returns will be collected under the proposed arrangements is that in which there is the least amount of pauperism, and the least pressure on the Poor-law officers. One of the causes of the difficulties encountered in the experiments of last year was the late period to which they were unavoidably postponed.

Should it be found, in any particular instances, that properly qualified classifiers and enumerators cannot be obtained by means of the above machinery, the Poor-law Inspector in whose district the union lies might be entrusted with the appointments in question. It is probable, also, that the Inspectors might be from time to time able to render valuable aid in unexpected cases of difficulty, either in the first organisation of the machinery or subsequently, without much interference with their ordinary official duties.

The Boards of Guardians should also be requested to nominate statistical committees from among their number to assist the classifiers in their labours, and to form the estimates of produce hereafter referred to. The value of such committees was rendered very evident in the experiments of 1853 and 1854.

The Committee consider that of the three returns which they have spoken of as necessary in any system of Agricultural Statistics, the two relating to acreage and stock should be embraced in one schedule, and obtained from the occupiers at the same time. By this means the necessity of more than one application a year to each individual will be avoided, and a certain expense saved. It is true that on some accounts it would be desirable to take the returns of stock at a later period of the year than those of acreage, and some of the witnesses objected to any date being fixed for the stock returns prior to the annual migrations of cattle, sheep, &c., from the breeding to the grazing dis-

tricts, inasmuch as an inaccurate representation of the characteristics of particular counties would thus be given. But bearing in mind that, however much the statistics of any particular district may be thereby affected, the return for the whole country will remain unaltered, as what is omitted in one county will appear in another, if a uniform day is appointed for taking the statistics of stock, the Committee do not think the objection in question to be so great as to make it worth while to call upon the farmers to fill up two returns annually, instead of one.

It is obvious that, however valuable and interesting may be the acreage returns, their especial value will consist in their being the basis upon which to found the estimated returns of the produce of the harvest in each year. These estimates should not be made in the case of every farm (as it would be impossible to get the farmer to give the particulars of his different crops, and impolitic to apply to him for them), but only for every Union, or other convenient district, in the manner adopted by the Highland Society in the Scotch experiments, by means of District Statistical Committees, the members of which should make observations in their respective districts, witness experiments in thrashing, &c., and finally meet and compare notes before fixing the estimated produce per acre in bushels for each Union or district, that amount, when applied to the acreage already ascertained, giving the required return. Where such committees are not formed, the classifiers should, with the aid of the enumerators, or such other persons as the Board of Guardians may appoint for that purpose, arrive at the same results in a similar manner. Although no farmer should be compelled to make any return respecting his crops, it may be found very useful to request those occupiers who desire or are willing to give information on the subject, either to return their actual produce per acre, or to state whether it has been equal to, above, or below an average. A certain number of such returns, even if not made very extensively, would doubtless prove useful auxiliaries to the committees in estimating the average for the district.

The period for the issue of the schedules of acreage and stock by the enumerators to the occupiers should be on the 1st of June in each year, previous to which date all the preliminary arrangements must, of course, have been made between the Poor-law Board and the Boards of Guardians. The Board of Trade having fixed a day for making a return of stock, the enumerator, after allowing the occupiers ten days to fill up the returns, should collect them again, and give them to the classifier, who should transmit to the Poor-law Board the Union Return in a complete form by the 15th of July, so that the Board of Trade may be enabled to publish the collective returns for the whole of England and Wales by the 1st of September.

The estimate return should be made up in the respective districts between the 1st and 30th of November, to be sent to the Board of Trade, to be published as soon as possible.

The Committee are of opinion that the extent of holding, below which it is not expedient to extend the inquiries, should remain the same as in the experiments already made; viz. two acres.

It will be necessary to provide in the Act of Parliament that the parochial rate-books shall be at all times accessible to the properly authorised persons employed in the collection of the statistics. When these books are properly kept, they will form a most important check upon the accuracy of the individual returns, as they contain a statement of the extent in acres of the holding of each occupier in the parish, which ought to correspond with the totals in the schedule. It has been stated, however, to the Committee that in many instances the rate-books are at present most imperfectly kept, and that they frequently do not contain the requisite information; it will, therefore, be necessary to provide that they shall be in all cases properly filled up in future, and to inflict penalties when this is not done.

In making provision for the proper remuneration of the enumerators and classifiers employed, it may also be desirable to provide for the infliction of penalties upon them, in the event of any wilful neglect by them of their duties.

Having

Having now completed their suggestions on the subject of the collection of Agricultural Statistics in England and Wales, the Committee have to observe, with respect to Scotland, that they have satisfied themselves that, taking all the circumstances of the case into consideration, it will be advisable to leave the superintendence of the collection of the returns entirely in the hands of the Highland Society, subject to the general supervision and directions of the Board of Trade, as heretofore; while the course of action pursued in 1854, with the modifications intended to be introduced this year, appears sufficiently adapted for the purpose. The alterations made in 1854, as compared with 1853, were—1st. A general provision for all the schedules when filled up being transmitted direct to the Society in Edinburgh by the occupiers, and not through the enumerators, instead of a mere option to that effect being given, as in 1853; and, 2dly. The substitution of a rent basis for one of acreage, as defining the lowest point to which the inquiries should descend; that is to say, that, instead of making the returns embrace all holdings of two acres and upwards, they should extend them to all holdings of 10*l.* a year and upwards in the 26 Lowland counties, and of 20*l.* and upwards in the seven Highland counties; a return of the smaller holdings being periodically made, say every five or ten years. The further changes which are to come in force this year, however unavoidable, are unsatisfactory in their nature, as they involve the omission of several important columns of information that were previously given, such as those of pasture, sheep-walks, woods, &c. But the Committee have been satisfied that, in the absence of any complete survey of the whole of Scotland, in the entire ignorance, in many cases, of the farmers as to the total extent of their holdings even approximately, and for other reasons explained in the evidence, those columns cannot, under present circumstances, be given with any approach to accuracy, and that it is therefore advisable to omit them altogether rather than publish delusive returns. It is to be hoped, however, that the Ordnance Survey of Scotland may be shortly completed, which will enable these important returns to be satisfactorily made.

The dates proposed by the Highland Society for the collection of the returns are as follows:—The schedules to be issued by the Society on the 1st July in each year, and returned on or before the 20th July (the stock being enumerated on the 10th July), the publication of the returns to take place of course as early as possible. The Society appear to be of opinion that this cannot be done before the end of September, owing to the difficulty of getting up arrears, &c.; but the Committee trust that a considerably earlier date of publication may be eventually found practicable. The Society further propose that the estimates of produce should be made between the 15th and 30th November, and the results published in the course of December. The Committee have only to urge upon the Government the importance of making the English and Scotch returns simultaneously, more especially in the case of the stock return, otherwise the same stock may be returned twice over.

With respect to the returns of Irish Agricultural Statistics, the Committee recommend that the existing machinery of the Constabulary, under the superintendence of the Irish Registrar-general, should remain in force. The returns are very much more minute than those sought for in Great Britain, and are brought so low as to embrace the smallest holdings, which are excluded from the English and Scotch returns. This arrangement the Committee would not propose to disturb, inasmuch as, from the large number of small holdings in Ireland, any return from which they were omitted would give but a very imperfect return of the real state of the agricultural statistics of that country; and, moreover, very valuable evidence respecting the social condition of Ireland is obtained by it; but they would suggest that the Irish Office should, in conjunction with the Board of Trade, carefully examine into the form of the returns, and simplify them as far as possible. They think, for instance, that the detailed publication of the statistics of each Electoral Division is unnecessary, and that it would be sufficient to give them for the unions and counties. Such minute subdivisions as the ages of the different descriptions of stock, and the columns for goats, poultry, &c., seem also unnecessary.

There does not appear much reason to doubt the general accuracy of the returns of acreage and stock in Ireland, although objections have been raised

to the correctness of the estimates of produce. The Committee have ascertained, however, that the Registrar-general has recently taken steps to guard against the probability of error in this respect, by means of enlisting the co-operation of the Boards of Guardians of the different unions in forming the estimates in question, in a manner similar to that recommended to be employed in England; and they trust that in future the returns may, with the aid of those authorities, of the various agricultural societies existing in the country, and of others who may be willing to assist in the matter, be rendered as approximately accurate as their nature admits of.

The question of the present system of ascertaining the corn averages has come under the notice of the Committee in the course of their inquiries. All the witnesses who were examined on the subject agreed in opinion that the returns obtained under it are very inaccurate, a large quantity of the corn sold being never included in them, and, on the other hand, the same corn being frequently returned twice, or oftener. It is to be remarked, that when complete Agricultural Statistics are systematically collected, these returns of the sales of home-grown corn will become comparatively useless as to quantity, although returns of the average prices will still be required for Tithe Commutation as well as for other purposes.

It has been proposed to the Committee that the returns of sales and the prices should be in future made by the seller, or by the seller and buyer, instead of by the buyer alone, as at present provided. The Committee, however, have not received evidence to satisfy them that it would be possible in practice to ensure strictly accurate returns under the system proposed, and they are not prepared to recommend so important a change in the existing law. They consider that a great part of the inaccuracy complained of arises from the fact of the requirements of the present law not having been properly and fully complied with hitherto; but they understand that the Board of Trade has recently taken steps to ensure their more punctual execution—a course which the Committee entirely concur in.

The Committee think that the list of towns from which the returns are made should be closely scrutinized and amended, and that all should be included in which a certain fixed quantity of corn is sold weekly: by this means the returns would be both simplified and improved.

The Committee have, in conclusion, to sum up their recommendations in the following Resolutions, to which they have agreed:

1. That the systematic collection of Agricultural Statistics throughout the United Kingdom is an object of national importance, and that amongst the many classes that would benefit by it, none would derive greater advantage than those connected with agriculture.

2. That it is expedient that powers should be given by Act of Parliament to compel the occupiers of land to make the necessary returns, in case of their neglect or refusal to do so.

3. That the Board of Trade should be entrusted with the general superintendence of the collection of the statistics in Great Britain, through the medium of the Poor-law machinery in England, and the Highland Society in Scotland; and that the Irish Government, in continuing to superintend the collection for Ireland through the agency of the Constabulary, should from time to time consult with the Board of Trade on the subject, for the purpose of securing as much uniformity as possible in the returns obtained for the different portions of the kingdom.

4. That two classes of returns should be annually obtained, the first containing facts, and the second estimates; and that the facts should consist of returns of live stock, and of the acreage under each description of crop, while the estimates should consist of estimates of the produce of the harvest. The acreage and stock returns should be sent in by the 15th July, and the estimate returns made up between the 1st and 30th of November.

5. That the schedules to be employed (and which should be introduced into the proposed Act of Parliament) should be sufficiently comprehensive, but

but that power should be given to the Board of Trade to omit any portion of them on any particular occasion, and, on the other hand, to modify them as circumstances may show to be desirable. The schedules employed in the inquiry of 1854 will form an appropriate basis for the permanent schedules.

6. That the inquiries should not be required to extend below holdings of two acres in England and Wales.

7. That the parochial rate-books should be at all times accessible to the properly qualified officers employed in the collection of Agricultural Statistics.

8. That the requirements of the Act for taking the corn averages should be more strictly carried out by the local officers entrusted with their execution than appears to have been the case hitherto, and that the list of towns from which the returns are made should be amended.

9. That as the collection of Agricultural Statistics is a matter of national interest and utility, it is reasonable that the expenses connected therewith should be defrayed out of the National Exchequer.

10. That it is desirable that the Government should introduce a Bill into Parliament as early as possible, for the purpose of carrying into effect such of the above-mentioned recommendations as may require the intervention of the Legislature for their due execution.

And the Committee have directed the MINUTES OF EVIDENCE taken before them to be laid before your Lordships.

26 *July* 1855.

MINUTES OF EVIDENCE.

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LORDS PRESENT:

Earl DONCASTER.	Lord LOVEL and HOLLAND.
Earl CARNARVON.	Lord COLCHESTER.
Earl HARROWBY.	Lord PORTMAN.
Earl STRADBROKE.	Lord STANLEY of Alderley.
Earl BURLINGTON.	Lord MONTEAGLE of Brandon.
Lord BERNERS.	

LORD STANLEY OF ALDERLEY in the Chair.

Evidence on the best Mode of obtaining accurate Agricultural Statistics.

J. H. Maxwell, Esq.

19th June 1855.

JOHN HALL MAXWELL, Esquire, is called in, and examined as follows:

1. *Chairman.*] YOU are the Secretary of the Highland and Agricultural Society of Scotland?
I am.

2. Has your attention been long turned to the importance of obtaining accurate agricultural statistical returns from Scotland?
It has.

3. Will you state to the Committee when your attention was first called to the subject, and what course you have taken with a view to obtaining those returns?
The attention, so far as I am aware, of the Highland Society was first called to this subject in 1847, or rather I should say that they then first endeavoured to call the attention of the Government to the subject, as in that year the Society, at their general meeting, memorialized Sir George Grey, who was then, I think, the Secretary of State for the Home Department: at all events the Society was referred by Sir George Grey to the Board of Trade, and they ascertained from the Earl of Clarendon, who was then the President of that Board, that the subject was under the consideration of his department. The Society was requested to report its views to the Board of Trade upon the question. On looking back to my notes, I find that, in May 1847, I was sent to London; I was then the Secretary of the Society, as I now am, and I had interviews with Mr. Milner Gibson, who was the Vice-President of the Board of Trade: there was laid before me the draft of a Bill which was intended to be brought in for England; and we were informed that the same measure was to be proposed for Scotland: it was not exactly such a measure as those whom I was representing would have approved of, and that was intimated at the time to Mr. Milner Gibson; but I believe the whole project then fell to the ground.

4. After that time did you, on behalf of the Agricultural Society, make any attempts for the purpose of obtaining returns for your own information?
No, we did not. Our next step was in 1852, when we again memorialized Government: we laid a memorial before Mr. Labouchere, who was the President of the Board of Trade, urging the necessity and expediency of considering the subject. Mr. Labouchere returned a favourable answer, and expressed a hope that, if the Government were to do anything, the Highland Society would be able to co-operate; and he requested the Society to report how their co-operation could be afforded. The result of some correspondence with Mr. Labouchere was, that I was desired by the Directors of the Society to prepare a scheme for collecting statistics:

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that scheme was prepared by me, but it never came before Mr. Labouchere, as, in consequence of his resignation, it came under the notice of Mr. Henley, and at his request we made an estimate of what we considered would be the expense of carrying it into effect in three counties; but before Mr. Henley could act upon this, he had also left office, and the Society's proposal fell into the hands of Mr. Cardwell: the result was that the Highland Society was authorized by him to work their scheme in the counties of Haddington, Roxburgh and Sutherland, in the year 1853; and the sum which was estimated was granted by the Government. This was done at a conference in February 1853, at which the Duke of Buccleugh, the President of the English Agricultural Society, and others, including myself, were present.

5. Will you explain to the Committee the mode which you adopted upon that occasion to obtain the returns, and what success you met with?

The mode adopted then was very much the mode which was followed in 1854, and is now again in course of operation; for example, taking the county of Roxburgh, we divided it into certain districts for our purpose, grouping the parishes with a view to their agricultural features, so as to have, as far as possible, a district similar in its agricultural products, and in the character of its farming. We selected and secured the services of an influential, intelligent, active practical farmer in each district, as the enumerator, and we gave him a committee to aid and to work under him, consisting of farmers of a similar stamp, connected with the different parishes, so that in fact each parish in the district was represented at the committee. I prepared a form of schedule, of which I hold a copy in my hand; in some respects it has since been altered, and in one important point in particular we have since deviated from the plan of 1853. The necessary number of schedules were then sent by me to the enumerators of districts, by whom they were circulated amongst the occupants of land; they were returned to him, examined, and sent by him to me, and then I tabulated and booked them. Now, we found that that system did not work well; I found, particularly in the pastoral districts, that there was a decided disinclination to pass the filled-up schedule, containing answers to the queries, through the hands of any neighbour, however respectable or well liked he might be. I held a meeting on this point; among other places, at Hawick, when there was a sort of compromise effected; the farmers agreeing to support the inquiry, provided they were allowed to direct their answers to myself; they seemed to prefer that I should receive and look at them rather than any neighbour.

6. Earl *Doncaster.*] Did not the difficulties you have described proceed from the extreme jealousy which exists amongst stock farmers of the amount of stock on their respective farms being known?

I should explain that I found a jealousy against the answers passing intermediately through the hands of the district enumerators everywhere; it was a general objection; but for the reason which has just been mentioned, the objections were much stronger in the pastoral districts. There was another circumstance which tended to enhance a certain amount of jealousy on the part of sheep farmers: in the schedule there was no question put to any tillage farmer with regard to the produce of his crops; the acreage of these crops being taken as a basis for getting at their yield; but, for the sake of getting the information I required, I was obliged to ask the sheep farmer to tell the number of his sheep, which is the measure by which his rent is supposed to be tested; I had therefore more trouble with him than with his low country brother. I had to hold meetings in various parts of Roxburgh and Haddington, and I had to go to Golspie, in Sutherland. Until the matter was explained, there was a strong disposition against affording the information; but this disappeared when farmers were assured that individual returns would not be published, and that the printed report would indicate the gross stock, not of one estate, or one parish, but of a large district comprising many parishes.

7. *Chairman.*] In fact, you found a great indisposition amongst farmers to have their affairs known?

At first; but when it was explained to them that they might, if they chose, send their returns through me, and that they would not be published in detail, the difficulty was diminished.

8. You

8. You found that all difficulty vanished when they sent the returns to you instead of sending them to the enumerators of their own parish?

Yes, in a great measure; and this induced us, in 1854, to make the alteration general, and entirely to give up passing schedules through the enumerators.

9. Earl *Stradbroke.*] When those returns were sent, did you find that they were correct returns?

I have every reason to believe that they were.

10. *Chairman.*] Will you proceed to describe the process?

I have described the staff; I shall now describe the schedule. The occupant was asked to state, first, the total number of acres on his farm, then the total number of these arable, and the manner in which the farm was subdivided; that is, the acreage of every crop, of fallow, grass, sheep-walk, waste, roads, fences, &c. &c. A return of wood was taken exclusively from the proprietor. The schedule also contained columns of stock. I have already stated that the tillage farmer was required merely to state, as a basis for after inquiry into his produce, that which was patent to any one, the acreage of his crops; but as acreage affords no criterion, in pastoral districts, of the stock maintained on it, the stock farmer had to return directly the number of head possessed by him.

11. Lord *Berners.*] Is not it the custom to value a sheep-farm, not according to the acreage, but according to the number of sheep?

Entirely according to the number of sheep. In many instances, sheep farmers have no idea what their acreage is, not within many thousands. To proceed with a description of the plan followed. The Committee will observe, with reference to stock, that when I got the answers to the schedule, the work was done. I had merely to add the individual returns in each district, and to put the results of different districts together, in order to show the stock of a county; but I had another process to go through in order to arrive at the yield of the crops: though I had received from every occupant a return of his acreage, and of how that acreage was subdivided into wheat, barley, oats, &c., such a return did not tell me how many bushels per acre he had raised. It was deliberately considered, and it was very early resolved, that it would be most impolitic and inexpedient, with a view to success, to ask the farmer any direct question as to his produce. We believed that, as a voluntary measure, it would not succeed if he were so asked; and that there was less risk of deception by resorting to some indirect method, such as we did adopt. The method was this: the enumerator of a district and his committee, the committee being a jury for the district, and the enumerator, you might say, being the chancellor of that jury, received written instructions from me in the course of the summer to keep their ears and their eyes open, to observe how the crops were looking, to inspect their respective parishes, and to ascertain their neighbours' opinions as to the prospects of the harvest; and by such a course of inquiry, commenced before and continued after harvest, while the crop was growing, when it was cut, after it had been stacked, and up to the time of some of it being thrashed or weighed, each man in his own parish was directed to form an estimate of the probable average yield per acre of each grain and root crop. The enumerator then summoned his committee or his jury together; they compared notes for the different parishes, struck an average for the district, and reported to me that for their district, in their opinion, the average yield amounted to so many bushels of wheat per acre, so many bushels of barley, oats, &c., and so many tons of potatoes, turnips, &c.

12. The return was given for the whole of the district, and not specifically for each farm?

Not for each farm; it would have been quite impossible to have given it in such detail.

13. What class of persons did you select for the office of enumerator?

I selected him as a farmer of as much experience and knowledge of his profession as any other farmer in the district, and supposed perhaps to possess influence with his brother farmers. I endeavoured to select a popular, influential, active, intellectual man, who could correspond with me, and in whose faith and honour I had perfect confidence.

 14. *Chairman.*]

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14. *Chairman.*] How did you remunerate him for his services?
I remunerated him out of the grant.

15. Did you give each enumerator the same amount of remuneration?
After the work was over, I sent each of them what, to the best of my judgment, I considered was a fee approaching to the size of his district, and the work he had to do. In 1853 I had three counties, and out of the grant I was enabled to satisfy the enumerators, and at the same time to save a considerable sum to Government.

16. Did you apportion the remuneration according to the work that was done by each enumerator?
Yes, according to what I conceived was his labour and responsibility in 1853; I did so upon the same principle with a much larger sum in 1854.

17. Did you generally find that they were satisfied with the amount of remuneration which you gave them for the work done?
There was only one instance in 1853; and no instance out of the many in 1854 in which there was the slightest grumbling or dissatisfaction. In 1853, I may mention that 900 *l.* was the estimated cost of the inquiry, and the outlay was 667 *l.* 0 *s.* 8 *d.*, and the balance was not drawn from Government.

18. Earl *Harrowby.*] What length of time were the enumerators engaged in the work?
I issued the schedules on the 1st of May; there were two reports that year, one of acreage and stock, and the other the estimate of the crops; the first report was dated 25th of July. The supplementary report or estimate of produce was not published by the Board of Trade, but by their permission by the Society on our own responsibility; it was dated 19th November; so that it took from the 1st of May to the 19th of November to complete the inquiry.

19. What length of time were they engaged in taking the produce?
If they did their duty, as I conceive they did, their attention was directed to the subject while the crops were growing, and up to the period when some part of them had been thrashed.

20. They did not wait till the crops were nearly ripe before they began to estimate?
They employed themselves in making observations and taking notes, with a view to an after decision, during the growing of the crops, the cutting of the crops, while they were in the stack-yard, and when they were in the barn.

21. Earl *Doncaster.*] You did not appoint one particular day for inspection, but they were constantly at work?
No; when a particular day was named, it was for the members of committee to meet and compare the result of their note-taking and observation over a period of perhaps two months.

22. *Chairman.*] Do you consider that it would be desirable to make returns more frequently than once a year, and at what periods do you think it would be most advantageous to make those returns?
That depends very much upon the object of the inquiry: if the object is to give early information to the public with reference to the result of the crops, then the schedules should be sent out as soon as the last crop is sown; that is to say, as soon as the farmer knows exactly how his acreage is subdivided into different crops, and they should be sent back without delay, so that the returns of acreage may be engrossed, tabulated and summed up for each county, ready for being multiplied by the estimated averages as soon as they are lodged, in order that the report of the yield of each crop may be laid before the public as early as possible. The period for lodging these estimates of produce should be regulated with the view of securing, even in backward districts, sufficient time to enable enumerators and their committees to mature their observations. Some months ago, and before the arrangements for 1855 were finally fixed, I called, in Edinburgh, a numerous meeting of farmers, enumerators and members of committees, and, among other matters, I brought that point before them; I pointed out to them that in the two former years there had been no fixed time for taking these estimates; that some were as early as the end of September, and others were as late as the beginning of December; and I said they ought

to

to fix a period generally within one fortnight, and as early as compatible with accuracy, when the juries should meet all over Scotland. The period fixed, after considering the matter, was between the 15th and 30th of November: it was thought that we could not, with proper regard to the later districts, fix an earlier period, so that in this year the committees are to meet between the 15th and the 30th of November: my latest estimate I presume will come in by the 30th of that month; I shall then have the acreage returns tabulated, and I hope, by the middle of December, to have the report before the public. That is the plan which I conceive should be followed, if the object be to give early information to the public about the crops. Some farmers, however, particularly one gentleman, Mr. Dudgeon, of Spylaw, who wrote at an early period on statistics, argue in this way: "Do not issue your schedule so early, because you take the stock at a most inconvenient period; you take it along with the acreage, between the 1st and the 20th of July, and no farmer has his feeding houses full then; therefore you should defer the inquiry as to stock until winter, and take the returns in November, when you will get our byres full." The answer to this is, that a return of stock in November would either involve a double return, two applications to the farmer, with a duplicate of the whole expense and trouble, which is quite out of the question; or it would postpone, until the month of March, the information relative to the results of the harvest. In reference to this point, I have always urged on the farmers that the main and legitimate object of the inquiry is to obtain, at as early a period as possible, authentic information in reference to the annual yield of the crops, and that comparative returns as to the agricultural resources of different counties form a secondary consideration. I have further pointed out that by taking the stock returns in July, Government gets, year by year, the whole stock of the country, if it is taken, like the census, upon a given day, and that for public purposes, it matters not in what district or in whose hands it may be; indeed, as some farmers regard the inquiry as a little inquisitorial, we have the advantage of annually enumerating stock, and of knowing its fluctuations, although the return is made at a time when one man has confessedly too much, and another too little; and thus, though the Government gets the whole, the return cannot be perverted. These views have been adopted by the farmers officially connected with the measure; and one return in July has been approved of.

23. Did Mr. Dudgeon propose that you should take a return of the stock twice a year?

No; he proposed, if I recollect rightly, that we should send out a schedule for the acreage in July, which is to be done; and another schedule for the stock in November; and when I informed him that it was quite impossible, because we could only approach the farmers once, keeping in view time, trouble and expense, he said, "Then put off your acreage returns, and postpone the publication of the results of the harvest, in order to get more correct returns of the stock—not more correct with regard to gross numbers, but more correct in regard to the capabilities which different districts have of feeding stock."

24. As far as the number of stock in the whole of Scotland is concerned, is it not immaterial in which month you take the return, because if the stock were not in Roxburghshire, it might be in Sutherland?

The stock may be in England or in Scotland; but if the inquiry be general, and the return simultaneous, it is unimportant where it be.

25. Earl *Doncaster*.] Would it not make a very great difference in the amount of stock if you took it in November, by which time a very large proportion has migrated south?

Yes, in Scotland, perhaps; but no difference as regards the stock of the country at large.

26. Earl *Stradbroke*.] By taking the return in November, would it not be probable that you would have a more correct account of the quantity of stock to be fatted for the coming year, as well as having this advantage, that the farmers, having thrashed some small portion of their corn, would be better enabled to judge of the amount grown that year?

There is no doubt whatever that a return taken as regards stock in November would be a more satisfactory return. It is a mere weighing of advantage as to whether that would counterbalance the loss of a good many months in getting

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the return of the harvest, because, supposing that I do not get the returns of the acreage till the last fortnight of November, there is an immense deal of manual and clerk's work to be done after that. Every return has to be transcribed, and the columns to be added, before the estimate of produce can be made available. For example, I receive from a district returns from 100 occupants, showing 5,000 acres of wheat. This return is not made till the end of November, and at the same time the estimate per acre is reported to be 30 bushels. I require to get every tenant's name written down, and the whole particulars of the farm engrossed, before I can ascertain the acreage, and use 30 bushels as the multiplier, in order to bring out the result.

27. Does not it often happen that a farmer may suppose he has 32 bushels per acre when the corn is ripe or cut, and when he comes to thrash it, he finds he has not 28?

The farmer only returns to me his acreage, as to which there can be no mistake in cultivated districts. The produce is estimated by the district committee, who do not proceed to draw up their verdict upon the evidence which has been taken all over the harvest until, at the earliest, the 15th of November. So that the difficulty alluded to in the question is obviated.

28. *Chairman.*] Does not the return made in July state the number of acres that is under each particular crop?

Yes.

29. Earl *Harrowby.*] Is not information given in November too late in the year to be valuable to the public, with the view to make any provision before the winter?

I believe that in Scotland there is little wheat sold, except for seed, until after that.

30. Is that information valuable to merchants in their speculations?

I am not competent to express an opinion upon that subject.

31. *Chairman.*] Would not it be impossible, in Scotland, to give any return of the produce earlier: the oat harvest is not finished till late in October or November?

I think it would be unsafe for Government or the public to attempt to get the estimates at an earlier period than the last fortnight in November.

32. Will you state what alterations you introduced in 1854, and what alterations you think might with advantage be introduced in the collection of the statistics?

In 1854, at a conference with the Board of Trade in relation to the Industrial Museum, which has since been established in Scotland, the Duke of Hamilton, the Duke of Buccleugh, and other members of the Highland Society, availed themselves of the opportunity to urge the prosecution of the statistical inquiry, and I was required by Mr. Cardwell to estimate the cost of putting the same measure into operation over the whole of Scotland, which had been tried experimentally in three counties; the sum estimated was 6,000 *l.*, which was granted. I may mention, that the same system generally was followed in 1854 as in 1853. There were only two alterations of any moment to which I think I need allude: the first I have already explained, namely, that the schedules were issued directly by me, and returned to me. The other alteration was, that in 1853 we served schedules upon all occupiers holding as small a portion as two acres, so far as my memory serves me; but in 1854 we made rent, and not extent, the line of demarcation: we still believed it to be absurd to send schedules to every little occupant of land, who could neither comprehend the schedule, nor fill it up; but we thought rental was a better limitation than acreage: a man might hold two acres, and pay a comparatively large rent, much larger than one in the Highlands holding 20 acres, and paying a few shillings; we therefore adopted the money limitation to fix the point at which schedules should be issued. We found it necessary again to draw a distinction between the Highland and the Lowland districts; we believed we might safely send schedules to all persons in the Lowlands paying a rent of 10 *l.* and upwards; but we were told that it would generally be fruitless to seek direct information from Highland tenants paying less than 20 *l.*, so that it was resolved to take direct information, by the service of schedules, from all tenants in 26 Lowland counties

counties rented at 10 *l.* and upwards, and in the seven Highland counties at 20 *l.* and upwards. With regard to those below these marks, it was further resolved that I should devise some means or other of getting, through indirect channels, information to lay before Government, in order to exhaust the margin down to the lowest possible figure. This supplemental report is now ready to be lodged with the Board of Trade. The issue of the schedules by me, and the mode of treating the small holders, are, therefore, the two principal changes in 1854 as compared with 1853.

33. Will you state to the Committee how you filled up those schedules with regard to occupiers of land at less than 20 *l.* in the Highlands, and less than 10 *l.* in the Lowlands?

The schedule of 1854, with one exception, was the same for the larger holders as in 1853. The word "arable" was left out; we found that it caused confusion; one man applied one interpretation, and another construed otherwise what the word "arable" meant, and so we left it out. With the small holders it would have been vain to attempt to get the same details; so that their report, when it reaches the Board of Trade, will show the number of small holders in Scotland, the number of acres occupied by them in cultivation, and the amount of their stock of different sorts: there is no subdivision of wheat, barley, oats, turnips or potatoes. The difficulty of this section of the inquiry has been very much greater than I considered it would be when I undertook to get the information. There are above 42,000 small holders, and their acreage and stock is considerable. I find I have omitted to bring down the report with me, and I cannot charge my memory with details; but there are between 300,000 and 400,000 head of stock of different sorts.

34. How did you obtain that information?

I obtained it in various ways; I desired every enumerator to lodge a list of all the landowners in his district on whose estates such small occupants were located; I wrote to those proprietors or to their factors in cases where I knew that the proprietor was non-resident; having a general acquaintance all over Scotland, I had the means of doing so; I collected a great number of returns from estate books, estate plans and agents, and from the proprietors themselves, and likewise from the parochial inspectors of the poor where the legal assessment was in operation; sometimes I collected them by means of the enumerators and committee-men; but I was quite satisfied with the sufficiency of the agency, whatever it might be, in the different districts, which was employed for the purpose.

35. In obtaining this information for the future, must you rely upon those different sources of information, or do you think there is any uniform mode of proceeding by which you could arrive at the knowledge you desire?

I do not think so; but we do not propose to repeat this part of the inquiry; it has been a matter of considerable expense and immense labour. We have now got the results, and we conceive that we have very fair information as to what may be called the holdings of the crofting population in Scotland. Their number is large; but their statistics agriculturally are trifling with reference to the general stock and crop of the country, and we do not think that any variation to which they might be annually liable could affect general results so as to make it at all worth while every year to repeat such an inquiry; we therefore propose, in 1855, to assume the returns of small holders which have been obtained in 1854.

36. What proportion does the stock and produce held by these small occupiers bear to the gross produce and stock of Scotland?

Very trifling, about 330,000 to 6,000,000.

37. Earl *Harrowby.*] Shall you notice in your return of such and such year that the small holders have been taken upon the previous basis?

Yes; last year we took the crofting population of Sutherland as returned in 1853. The enumerators satisfied me that there was no great change, and we adopted the information which was collected in 1853, and applied it to 1854.

38. In your statement you would always note that you had done so?

Certainly.

 39. *Chairman.*]

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39. *Chairman.*] Do you think it would be difficult to repeat every year the number of those occupiers?

It would be very difficult, but we might make some arrangement of this sort. We know that there are large proprietors who have large bodies of these people; they might, through their agents, report when there was any emigration among them, and some effect may be given to it. For some years, at all events, we think it would not be worth while to repeat the inquiry.

40. Would not it be better to do it at stated intervals, as a point of comparison, say once in five years?

I think so, decidedly; perhaps once in 10 years. In case, however, this opinion should be misunderstood as applying to the main part of the inquiry, perhaps I may be allowed to read certain queries which were put to me last year by Mr. Cardwell, upon the point of the occasional repetition of the inquiry itself: "Suppose an accurate return of acreage under each kind of "cultivation were obtained (say for the year 1854), would it be possible to "obtain an estimate in each subsequent year of (say) nine following years, "showing for the several unions the proportion of each kind of growth to the "quantity grown in 1854, and at what expense? I want to know what degree "of economy might be thus obtained. In this view, the accurate survey would "be, like the census, an expenditure once in 10 years, with a small annual cost "besides." My answer was, "The questions put to me involve the con-"sideration of two points, efficiency and economy. I do not think, supposing "the acreage of crops to have been ascertained in 1854, that during the nine "subsequent years a correct estimate could be obtained, showing, for the "different districts, the proportion of each variety of crop to the acreage of the "same in 1854. This would be carrying the principle of estimating results "farther than I have contended for, or would like to see adopted. By the plan "of 1853, the estimate is restricted to the average yield per acre, but the "average itself is a matter of fact. If both yield and acreage be estimated, the "risk of erroneous judgment is more than doubled; for I conceive the latter "would be the most precarious of the two. Markets and seasons do much to "influence the selection of crops. For instance, last year would, as regards "wheat, have been a dangerous basis, low prices and bad seed time having ma-"terially interfered with the breadth sown. This year again, I believe, the "extent will be beyond an average, but it would be a difficult matter to estimate "the difference. It should farther be kept in mind, that a fallacious estimate in "this respect doubles the error, because, if the extent of wheat is over-esti-"mated, that of oats or barley is necessarily understated. The case would be "somewhat different if, from the facts of nine years, we were to strike an aver-"age, and thereafter estimate how much the breadth of the different crops might "each year be above or below it. But I would have little confidence in taking "one year, and that perhaps an exceptional one, as 1853 was, or as 1854 may "be, for what may be called the datum line, on which to determine the results "of nine subsequent harvests. The census is different, its object is to notice "the progress of the population during certain cycles of years. That of the "statistical inquiry is to ascertain the food produced for the people year by year. "The economy of the proposal is more apparent than real, and the case of the "census does not apply. Its machinery during the nine intermediate years is "dormant, and I presume costs nothing. But with statistics, the principal "item, the cost of enumerators, would remain not only untouched, but would, I "believe, actually be increased under the proposed plan. The estimate of cost "for Scotland provides for 60 of these officers, on average salaries of 50 *l.* If "the schedules are issued from and not returned to the central officer, as has "been suggested, the duties of the enumerators will be, first, the use of influ-"ence, or exercise of local knowledge when information in regard to acreage is "withheld; and, secondly, estimating the produce. The second part of their "work would be undiminished during each of the nine intermediate years, while "the preparation of estimates of acreage would be added, and would, I conceive, "involve more trouble than that share of the schedule service which should fall "on them. Not only, therefore, would the 3,000 *l.* of salaries be still necessary, "but the sum would probably be insufficient. There would still be a central "office, and I do believe that the whole saving would be limited to two or three "clerks there, and some of the printing, paper and postages. There is another

"consideration

" consideration which should not be lost sight of, the first year's returns of " acreage may not be quite complete, neither may those of the second. We " must familiarise the minds of the farmers to such an investigation, and its " attendant queries; but this could not be accomplished with a decimal return, " as we should then every tenth year be recommencing the work with all its " original difficulties. Entertaining these views, I would, with great deference, " deprecate the adoption of any machinery such as has been proposed." As it is stated in the memorandum I have just read, that the breadth of wheat sown in 1854 would be larger than in 1853, I may mention that in Roxburgh there were 6,903 acres against 5,181; and in Haddington, 16,881 against 15,339; so that there was a very considerable difference.

41. Are there any further alterations proposed in collecting the statistics in 1855?

Perhaps I may mention, that in 1854 I had 107 enumerators.

42. At a cost of how much?

The estimate was 6,000 *l.* My accounts are not exactly made up, owing to the delay attending the report of small holders. I think the outlay will be about 4,200 *l.* for everything; the postage is 540 *l.*; and at one time there were about 40 clerks employed; that is a very heavy item. I believe the 107 enumerators have received considerably less than what was estimated, namely, 3,000 *l.*; my average allowance was about 20 *l.* to each; but I cannot at present be certain of that. Then I had a committee in round numbers of about 1,000 farmers; they received no allowance; but I addressed a circular to them, offering to pay any outlay or expense incurred by them: with few exceptions, they declined to make any such charge, and expressed their willingness again to give their assistance. I should mention, as I alluded before to the difficulties in the way, and to the objections to the measure entertained in some districts, that there was very considerable misconception at first of the objects of the inquiry, and of the uses which might be made of it; and I found it necessary to organise a system of public meetings all over Scotland; I wrote to the conveners of counties and to the chairmen of local agricultural associations; and in nearly every county town south of Inverness I had a public meeting. I very often found a great deal of prejudice beforehand; but the farmers gave me a fair hearing, and received my explanations in a fair manner, and the result was always a vote of approval, and a promise of co-operation. These meetings afforded me, besides, facilities for organising my committees. Where I could not hold meetings, and had to trust entirely to correspondence, in one or two of the northern counties, the arrangements were more difficult, and have been less satisfactory, so much so, that I find it will yet be necessary to go down to smooth the way in some of the northern districts. This I mean to do when I get back to Scotland.

43. Are the farmers generally sensible of the importance of obtaining accurate statistical returns?

The leading farmers decidedly are; and as to those who were not, the difficulty has been mainly removed by satisfying them that, whether these returns are to do them good or not, they cannot do them any harm; that the scheme is so arranged, the answers so brought out, and the reports so published, that they cannot be twisted against their interest in any matter of rent, rating or taxation. The main difficulty to get over was to satisfy the public that Government had no ulterior view in originating the measure; that it was neither meant for Government purposes with regard to taxation, nor for landlords' purposes with regard to rental. That had to be demonstrated, otherwise the support of the farmers would not have been given.

44. Earl *Harrowby.*] Is not the annual report of stock as important as the report of grain?

It can be taken without further difficulty or expense, as in taking the one return you can take the other at the same time; I conceive it would be desirable to know how far the stock is keeping pace with the wants of the population.

45. Lord *Monteagle* of Brandon.] When you state stock, what would you comprehend under the title of stock, as embraced in the return?

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I have in my hand the schedule for 1855, from which I will read what stock consists of: "Horses for agricultural purposes above three years old;" "horses for agricultural purposes under three years old;" "all other horses;" "milk cows;" "other cattle;" "calves;" "sheep of all ages for breeding;" "sheep of all ages for feeding;" "lambs, produce of 1855;" "swine." The columns for the small holders are merely "horses," "cattle," "sheep," and "swine."

46. You would not contemplate any advantage in getting returns of asses, goats, poultry, eggs and dogs?
Certainly not.

47. *Chairman.*] Have you turned your attention at all to the Irish agricultural statistical returns?
Not very particularly; I understand that the parties employed are the constabulary—a very fitting agency to note down a fact such as that there are so many acres of wheat or barley in a district; but I endeavoured to find out in Ireland whether there was any other agency employed with regard to matters of opinion which involve, as the estimate of crops does, professional knowledge and experience, and I could not find out that there was. If my information is correct, and if it be true that the estimate of produce flows as directly from the constabulary, as does the statement of fact with regard to acreage, I would not attach weight or value to that part of the Irish statistical report. I may mention, also, that in Scotland we are under the impression that the Irish estimates are too high, whoever they come from.

48. Earl *Harrowby.*] If I recollect, the estimate of all Ireland was 3½ quarters of wheat per acre; do you believe that to be the average produce of the whole of Ireland?
That is 28 bushels; that is our average for Scotland last year, which was a good year.

49. Did you see enough of Ireland to form any judgment whether that could fairly be considered the average produce of the whole of the country?
I do not pretend to say that I know Ireland; I may be prejudiced, as a Scotchman; but I have an impression that our average yield of wheat is higher than the average yield in Ireland; but I may be wrong; I find that our average yield of wheat last year, which was a good year, was 28 bushels 3 pecks.

50. Lord *Monteagle* of Brandon.] Taking the circumstances of last year, and assuming that the return made in reference to last year is correct, do not you think that that average as to other years must be too high, even in Scotland?
If it be a correct average for 1854, I am perfectly certain that it was above that of 1853. It is curious to observe, that though M'Culloch in his estimate of the acreage vastly exceeds what we ascertained upon inquiry into the fact, yet his estimated averages of produce come very near what we have estimated; it is somewhat below our estimate: the result, I think, is quite confirmatory of the correctness of our results.

51. *Chairman.*] Do you wish to show the inaccuracy of former estimates of produce in Scotland?
I wish to show that though M'Culloch's estimate of acreage differs from our return of it, his estimate of produce nearly approaches ours: this is in accordance with what might have been expected. A statist may, in different districts, get reliable information from intelligent farmers in reference to the yield of the crops; but the same authorities could not tell him, on estimate, how many acres of each crop there were in a district; that can be ascertained only by inquiry at every occupant. I may state that, in 1814, Sir John Sinclair estimated in round numbers the land under cereals, including beans and peas, at 1,800,000; M'Culloch at 2,050,000; and we brought out 1,374,500. Between M'Culloch and us there was a vast difference, but then again that was on a matter of fact; M'Culloch proceeded by an estimate of the fact, we by an inquiry into it. If we add to our return about 240,000 acres for small holders, our return varies little from Sinclair's estimate. M'Culloch estimated 350,000 acres of wheat; we find there were 168.216. He estimates 26 bushels of wheat per acre; we estimate nearly 29,—28 bushels 3 pecks: our estimates do not therefore differ much, and though arrived at, I presume, by different processes, confirm one another.

52. Yours

52. Yours is a good year?

Yes. His estimate of barley was 32 bushels to nearly 37 by us; of oats, 40 to our 36; it was not a particularly good year for oats; of beans, 24 to our 28. If you take off a per-centage from our estimates on account of 1854 being a good year for cereals, it brings us nearly to M'Culloch, and M'Culloch to us, in regard to averages, though the acreage, as estimated by him, and ascertained by us, differs widely.

53. Lord *Berners.*] In making these estimates, have you considered whether M'Culloch estimates the qualities, because there is a vast difference whether you calculate a bushel of wheat at 63 lb., or calculate it at 60 lb.; did you, in estimating your quantities, take notice of the qualities, that is, of the weight per bushel?

No, we did not go into that detail, we took it by bushels.

54. Earl *Harrowby.*] Have you at any time ever tried to estimate by taking a a square foot or a limited portion of any field, cutting off the ears, and rubbing them in your hand to see what the result of this proportion was as a datum point for estimating the whole of the field?

I do not know what different plans have been taken by different committees, but we do not encourage experiments per square foot, or per square yard, because we know how very deceptive they are; probably a person would take the best square foot he could find. Unless agricultural experiments are done in duplicate, and on a much larger scale than that suggested, we do not put any faith in their results.

55. Lord *Monteagle* of Brandon.] Are you not aware that some great commercial houses in England concerned in the corn trade have been in the habit of sending round to make calculations founded upon the *indicia* which have been described in the last question?

I have heard so.

56. Have you heard whether those have been very successful and have been persevered in, or whether, on the contrary, they have not been found illusory and have been abandoned?

I have no information upon that point.

57. *Chairman.*] Have you completed your statement with regard to 1854?

I should state, in regard to 1854, that we were late in getting authority to proceed, and we had great difficulty in getting the lists of our agricultural occupants; we had not then the same means and appliances which now exist; and instead of issuing schedules by the 1st of May as was the case in 1853, or by the 1st of July as will be the case this year, which is quite soon enough, it was the 1st of September before the earliest were sent out, while the issue was not completed till the 6th of November: there were about 50,000 schedules sent out; the report did not appear till the 23d of January. With regard to 1855, we have again estimated the cost; and, looking at the saving effected last year, and to the decreased expenditure which we may calculate upon this year, the estimate is 4,000 *l.* The schedules are to be issued on the 2d of July, the 1st being Sunday. I have perfect confidence in my list of occupants this year, and it will save both the public and myself much trouble and correspondence. Last year names were omitted, or names were repeated, to a very inconvenient extent; but after being weeded as well as we could weed them, lists of every parish have been sent to the members of committee or representatives of the parishes, and are now coming back to me carefully revised by them. The schedules are to be completed and returned on or before the 20th of July. The stock over the whole country is to be returned as enumerated upon the 10th of July. I have in my hand the schedule and the letter of instructions appended to it. The produce of the crops is to be estimated between the 15th and 30th of November, and the report will be published, I hope, about the middle or towards the end of December.

58. Will you state whether there is any alteration in the schedule itself?

There is an important alteration: in the two former schedules the total acreage of the farm is asked, and there was a column for every species of crop or product, grass, waste or wood, houses, and so on, that we could suppose entering into the division of the farm. We now only retain columns indicative of the land under tillage; that is, the land under crop, cereals or roots, under bare fallows, and under grass in the rotation of the farm.

J. H. Maxwell, Esq.

19th June 1855.

The Schedule is delivered in, and is as follows:

Highland and Agricultural Society,
Edinburgh, 2 July 1855.

Sir,

Her Majesty's Government having again entrusted the collection of the statistics of Scotch Agriculture to the Highland and Agricultural Society, I am instructed to send you this Schedule, with an earnest request that you will endeavour to complete and return it to me within a period of 14 days; your compliance with this will save you from being troubled with renewed applications, and will materially facilitate my labours.

Owing to the impossibility of correctly estimating the area of many pastoral districts, it has been resolved to restrict the acreage columns to the land under cultivation; that is to say, to land in grain or root crops in bare fallow, and in hay or grass, which in the ordinary rotation, of course, of cropping of the farm will sooner or later be again broken up.

The returns of stock are to embrace the whole stock in your possession on the 10th of July, as nearly as can be enumerated; and they are to include whatever belongs to any sub-tenant you may have, and to your farm servants or labourers.

The stock on grass parks let from year to year is returned by the proprietor, who is particularly requested to employ some one to ascertain with accuracy the number on the ground at the 10th of July.

The returns in this Schedule should comprise all lands occupied by you in the particular parish specified, or which are situated partly in it, and partly in an adjoining parish.

If you hold a farm entirely in another parish, you should receive a separate Schedule for a distinct return. If such Schedule has not been sent to you, be so good as inform me.

If by mistake more than one Schedule is sent to you for the same lands, you will send it back, with an explanation.

If you have no return to make, you are requested to send back the Schedule, with a statement to that effect.

Your attention is specially called to the note on the face of the Schedule, respecting Scotch or Imperial measurement.

The form in which the returns were published last year must have conclusively established, that all details are strictly confidential, and that the results of the inquiry cannot by possibility be brought to bear on any question of rental, rating or taxation. The Society, therefore, confidently anticipates a renewal of that cordial co-operation which it has already received from the farmers of the country, and which induced Government to place on record their testimony to the intelligence and public spirit of the Agriculturists of Scotland, in thus coming forward to promote a great national undertaking.

I am, &c.
(signed) John Hall Maxwell, Secretary.

To be completed and returned, if possible, before the 20th of July 1855.

Occupant_____

Farm_____

Parish of_____

County of_____

No. 1. Acreage.

1. Wheat.	2. Barley.	3. Oats.	4. Rye.	5. Bere.	6. Beans.	7. Pease.	8. Vetches.	9. Turnips.	10. Potatoes.	11. Mangold.	12. Carrots.	13. Cabbage.	14. Flax.	15. Turnip Seed.	16. Any other Crop.	17. Bare Fallow.	18. Grass and Hay under Rotation.

Note.—State here whether the acreage is Imperial or Scotch.

No. 2.

No. 2. Stock at 10th July.

1. Horses for Agricultural Purposes above Three Years old.	2. Horses for Agricultural Purposes under Three Years old.	3. All other Horses.	4. Milk Cows.	5. Other Cattle.	6. Calves.	7. Sheep of all Ages for Breeding.	8. Sheep of all Ages for Feeding.	9. Lambs, Produce of 1855.	10. Swine.

Signature of Occupant_____

_____1855.

59. Will you state the reasons why those are proposed to be omitted in the return of 1855?

The reason why the schedule has been curtailed was the utter impossibility in Scotland of obtaining any thing like authentic, correct or complete information under the omitted queries. Before completing the arrangements for 1854, we took the liberty of representing to the Board of Trade our apprehension that we should fail in obtaining the acreage of sheep-walks or of permanent pastures, because, as I have stated before, many of the sheep-farmers have no correct conception of what the acreage of their farms may be. Mr. Cardwell gave the Society authority to proceed as it might think best, but as he expressed a strong wish against the omission of these columns, it was thought better to let experience test whether our apprehension was well founded or not; the columns were therefore retained in 1854, but have been omitted in 1855, because our first impression has been so strongly confirmed, that we thought it our duty strongly to urge their being abandoned. Sometimes a sheep-farmer classed his sheep-walk under permanent pasture, and another sometimes under sheep-walks; but under both those heads there were thousands of acres not returned, and the non-return was indicated by the return of sheep. Sometimes a farmer in a pastoral county would send in a return of a few acres of arable land, and several thousand sheep, which must have been pastured upon many thousand acres, and no return of the acreage upon which they were pastured at all, because he told you he could not give it; others said they believed their farms were about so many miles long, and as many broad; but the information under those two heads in particular was so incomplete, and so loose, that it went far to disparage the accuracy of the rest of the returns in the minds of those who did not know the secret of the inaccuracy. The word "Total" in the schedule, which meant the addition of all that was returned to me, was too often read by the public as representing the area of Scotland, whereas it was enormously short of it. I think, in Sutherland, we were several hundred thousands of acres short. The same observations apply to the column for "Waste," now omitted; as also in part to "Woods," also omitted. In some districts there are large unmeasured tracts of natural wood, the acreage of which proprietors could not give. Looking, therefore, to the impossibility of obtaining full returns of extent in pastoral districts, and to the circumstance that a knowledge of extent was not required in connexion with returns of food; seeing that stock is itself enumerated, and considering that the returns obtained were useless, even in questions affecting the area of the country, we thought it much better to restrict the schedule, as has been explained. The columns retained show the land in tillage, including the grass under the rotation of the farm, which has been and will again be broken up. The returns under these columns indicate also the rotation in which a farm is cropped.

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60. The schedules are so altered as to give you all the information which is essential to the purpose of the food question?

Exactly; if you go beyond those schedules, you only get columns interesting and useful with regard to the area question; but the information obtained under them is so incorrect that they may mislead upon that question.

61. Lord *Colchester.*] As I understand, the twelve millions odd acres, in the first column, are merely the total of the other columns?

It is so; but it was too often read as relative to the total area of the country.

62. *Chairman.*] Do you propose to omit that first column for the future, as well as the others?

Yes.

63. Earl *Doncaster.*] You do not mean to retain it as showing the total number of acres in tillage?

Properly speaking, I believe, the hay and grass under rotation are acres in tillage. They are in the rotation of the tillage of a farm, and I conceive that the term "tillage" equally applies to all the columns on the new schedule.

64. Practically, in valuing a farm, that land would be considered arable land, although it might be at the moment in grass, which was only in rotation; of course it would be considered as a portion of the arable land?

Arable includes more than this, and is a more comprehensive term than tillage. There are many sheep parks let from year to year in grass, which, though not tillage, are arable.

65. *Chairman.*] Would it not be desirable to retain the column, giving the total number of imperial acres under tillage in the sense in which you describe it?

I have considered that, but it was agreed that it would produce error and correspondence. The farmers are very apt, this being a new matter, to go astray, and they might return the total acreage of their farms in place of the mere additions of the different columns. If persons, superior to some of them in intelligence, misread the "Total" of last year, as having reference to the area of Scotland, instead of the actual returns, farmers might suppose that the "Total" now meant the area of their farms. I would prefer having the summation calculated and inserted by my clerks, and there can be nothing very wrong. You may say that we have no check upon the details, but we have this check: these columns show the rotation, and from the rotation there should be so much in wheat, so much in barley or oats, &c., so much in green crop, and so much in grass; if a figure has been missed, or there has been some gross mistake made in the wheat, barley or oats, the rotation will show there is something wrong. The question was put to me, whether I had reason to believe that the returns of the acreage made by the farmers were correct. We had incidentally a very good test upon that point; some members of committee erroneously supposed that it was part of their duty to collect the acreage of their parishes for me. Whenever I got such a return, I had, in that particular parish, an excellent test of the accuracy of individual returns by the farmers; and I always found that the aggregate of the individual returns corresponded with the report by the member of committee.

66. You have tested the accuracy of your returns in several different quarters?

They were tested accidentally, as I have described. Suppose in parish A. I take from 20 tenants their individual returns of the crops, and I add them all up, and find 500 acres of wheat and 500 acres of oats; and a member of the committee, fancying that he had the same work to do, ascertains and reports the exact number of acres in that parish; if I find he also returns 500 acres of wheat and 500 acres of oats, I have a test of accuracy; and what was thus done accidentally might be, here and there, repeated as a check.

67. Have you any means of testing the accuracy of the returns of produce?

I may state that I know, in East Lothian, those who made the returns of the estimate of produce in 1853 kept careful notes of the whole of the thrashing of the crop of 1853; and the result was to verify the correctness of the estimates they had formed at an early period of the year.

68. Earl

68. Earl *Carnarvon.*] Have you any means of knowing whether the returns made to you of the stock were equally accurate or not?

I have no means of knowing.

69. There would be greater liability to misinformation than there would be with returns of produce?

Certainly; and I do not believe it is possible for any farmer to give the exact number of sheep in a large sheep stock. I have a strong impression that the farmers, being convinced that there was nothing covert under this inquiry, and that the published results of the inquiry could not hurt them either with the Government or with their landlords, felt an honest desire to make a faithful return.

70. Does not the whole of this system proceed entirely on the co-operation of the farmers?

Entirely; there is no compulsion used; and I have only to repeat, that when the farmer, who is fairly entitled to look to his own protection and interests, has satisfied himself that he cannot be injured in any way by the inquiry, either in its objects, or working, or published results, I have ever found his co-operation given heartily. This is not only the case with the larger farmers who have worked the measure under me, but with the farmers of the country generally; and the proof of that is, that the number of absolute refusals to make returns was amazingly small: the report on the table states what the per-centage of refusals was; it was very trifling; only one-fifth of one per cent.; and I am wrong in even saying that the refusals amounted to this per-centage, as it included the people I could not find, or could not hear of, and from whom I got no answers: I only remember at present three cases of positive refusal; one from a farmer, and the other two from proprietors: one of those proprietors is not a very responsible individual, and the other is a gentleman who was for some time a Member of Parliament for a large Scotch county.

71. Earl *Stradbroke.*] Do the gentlemen in the country generally give assistance?

Yes; they came forward thoroughly and heartily to do so, by themselves and their factors.

72. Lord *Monteagle* of Brandon.] In those cases of refusal to which you have adverted, were the reasons of the refusal stated, as well as the fact of refusing?

No; there was no reason stated. In the case of the gentleman who had been a Member of Parliament, he counselled the farmers at a public market not to answer the questions; he said they could manage their own matters without Government interference; and he warned them against me as an agent of Government. I encountered the same gentleman immediately afterwards at one of my public meetings; the farmers did not desert me; there was a vote of approval, and upon that the gentleman hauled down his flag; he said he would not divide the meeting, and, though not waiving his objections, would give the measure a fair trial; his fair trial was afterwards to refuse to give any information.

73. Lord *Berners.*] Would you consider it desirable to make the returns compulsory?

I consider it would be most undesirable in Scotland; I believe, to use a common phrase, it would put the back of the Scotch farmers up at once: they have been almost promised against compulsion. They have been told, if you give these returns voluntarily you will escape compulsion: we did not exactly go that length, but we said, the best way to escape compulsion is to give the information freely. We hope that in Scotland we have earned for ourselves freedom from compulsion, having given voluntarily all that compulsion can enforce.

74. Would it facilitate the returns, and do away with a great deal of the jealousy and objection that you have mentioned, if instead of having the schedule sent to each occupier, there should be a private meeting in the parish, presided over by your enumerator, and that there should be a joint return made for the whole of the parish?

You would then awaken the jealousy that I experienced in 1853; you would

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at once be starting the difficulty which was started then: the farmers would say, we do not care about telling you our acreage, and exhibiting the rotation of our farms to you, but we will not have that passing through the hands of our neighbour. It may appear egotistical on my part, but I do not believe that a farmer would like his returns to be sent in to A., B. or C.: I am not arrogating to myself anything; the Duke of Buccleugh knows what I mean. In the eye of the farmers I have a certain official position which, perhaps, does not exist in England, and for that reason my work was very much lightened; I had great facilities which no other person could have. The Highland Society has been so long in existence that it has taken deep root: our system is different from the English Societies. We have so much connexion with local societies, and so many old established societies, which are in some measure ramifications of our own, that the farmers will deal with us, not on account of myself, but on account of the body with which I am connected.

75. You stated that you should send your return for the acreage in July; and you also stated that you considered it was desirable that the return should be made so early, that the farmers might take the benefit of it in their future sales; could not the returns of produce be made at a tolerably accurate approximate acreage in August?

No, because the crops are not cut in August. If you allow that an accurate estimate can be made by looking at the growing crops in August, it might be done; but if you hold that the crop must be watched through all its intermediate stages, until it appears in the shape of wheat at market, you must wait till a later period. Our enumerators think they must have an opportunity of seeing it through those stages.

76. In point of fact, is not your return too late for the advantage of the farmers?

I wish it could be made sooner, but I do not think it is too late for the advantage of the farmers: they do not generally sell so early as that. We are anxious to give them the information at the earliest period consistent with safety. We think that an estimate such as this should be dealt with cautiously. At an early period, we saw the suspicion with which these estimates were regarded by the Board of Trade, as contradistinguished from returns of fact, and therefore we are anxious that our estimates shall not be open to any charge of being taken rashly, or at too early a period.

77. Earl *Harrowby.*] Would there be any objection to publishing the acreage by itself at an early period?

In 1853, this was done; we published the acreage return by itself. We could do so again, and publish the estimates in the beginning of December. I do not see why the acreage should not be published by the end of September.

78. Could not the acreage be published earlier than that?

It takes a long time to prepare after the returns are sent in.

79. Could not you begin your estimate of the crops at a very early period?

You must allow all the globe turnips to be finished before you send out schedules, if the return is to be quite correct.

80. You know what is to be in turnips before the month of May, do not you?

We know what is intended to be turnips, but it may be bare fallow, instead of turnips.

81. Do not you know what is to be in turnips in May?

Not conclusively until the end of June.

82. Earl *Stradbroke.*] Not white turnips?

We should not sow white turnips in Scotland until near the end of June.

83. Earl *Harrowby.*] Is the time taken in calculation considerable?

Yes; for two reasons. There are a great many arrears to make up after the 20th of July; we must allow a month for collecting those arrears, that brings us to the 20th of August. All this time the clerks may be writing up the books; but engrossing the name of every occupant, and the details of every farm, takes a great deal of manual labour, even with a strong staff. I should not like to promise

promise before the end of September or the first of October even the statement of acreage.

84. Would not there be some advantage even if England were published first, then Scotland, and so on?

Of course in anything regarding the food of the country, England so preponderates, that if there were any advantage in the earlier publication, it would be very important to have England out before Scotland.

85. So that whatever facts were important as guiding the public mind, or the transactions of merchants, should be published as fast as possible?

I conceive that both the estimate of the crops and the statement of the acreage should be published, the one as soon as it can be safely prepared, and the other as soon as it can be copied from the schedules.

86. The report for England need not wait for Scotland, I presume?

In neither the one point nor the other; although, farmers having a great deal of *esprit de corps* about them, and some degree of professional jealousy, I am bound to say I should not like to see the estimate of one country out before that of the other, because one would not like to be beaten by the other. I should like to see the estimates for England and Scotland all taken within one fortnight, and published at the same time. If the English estimates were published a month earlier than the Scotch, and were patent before our meetings of committee took place, the results with us might be affected.

87. The publication need not take place before the other estimate was made?

Of course, with any such precaution as that, there could be no difficulty; but without the early publication, the advantage of the early estimate would be lost.

88. Lord *Portman.*] If I understand you, the great success of your system in Scotland is founded on the arrangements being made by one head, under whom the whole of the staff work?

I do not mean to attribute success entirely to that; but I am convinced that, whoever that head may be, it will for Scotland be better to have one head; he might be in such an official position as to have almost a personal knowledge of the people in every district, with the means of approaching them, and facilities for finding out the best agents.

89. Your next great point of success was avoiding any direct questions that could create jealousy between neighbours?

Certainly; and any publication which could possibly interfere with or disclose private affairs.

90. If I understand you rightly, the first part of your system is to obtain a set of facts?

Yes.

91. And the second part of your system is to found a set of estimates on those facts?

Yes.

92. Are you of opinion that it is absolutely necessary for any public purpose, with reference to the food of the country, to obtain an estimated return?

Yes; it would no doubt be interesting and important to have returns of acreage alone; but, with reference to the question of food, I think that an estimate which tells you from year to year what the results of each year's harvest are, constitutes the pith of the whole thing.

93. Do you see no way of arriving at the fact of the produce of the crop at a later period than you get your estimate; and if you can obtain that fact by some return, would that not be more really valuable?

There is a return that would be more authentic, and which would be taken at a later period; it would be much more authentic, if you could get it, to require every farmer to tell you exactly how much he sells; but I must qualify that answer by stating, that the possibility of getting such a return has been well considered by us in Scotland, and we believe it to be most inexpedient to ask for it, and that it would be impossible to collect it; and, certainly, I am of

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opinion that the success, whatever it may be, which has characterised the results of this inquiry, would not have been such as it is had we tried any such plan.

94. If the facts of the first part were made known in the month of August, and the estimates on the second part were made known as soon as they were tabulated, would not that second information be exceedingly valuable with regard to the transactions of future years?

I conceive it would; if it were not useful for the transactions of future years, if it were not to be of use to the public who have to buy or sell in some way after the period of publication, there would be no great object in publishing it.

95. Would the 20th of October be a convenient time rather than the 20th of July?

I have only to repeat what I said before, that before I ventured to make any alterations in the schedule or the practice of 1854, or to lay down any new rule upon so important a point as the best time for taking these estimates, I called at Edinburgh a meeting, to which I have already alluded, of enumerators and members of the committee for the counties within an easy distance by railway. The meeting was numerously attended by practical farmers officially connected with the inquiry, representing at least a dozen counties; I was most anxious to induce them to give me an earlier period than between the 15th and the 30th of November; I pressed hard for between the 1st and the 15th of November; but they were so anxious (particularly those connected with the later districts) to have more time, and they were so unwilling to form their estimates until they conceived they could do so in a manner satisfactory to themselves and safe to the public, that they would not grant my request; I pressed my request, and they said you must give us a fortnight longer.

96. Do you think it is absolutely necessary to have these returns year by year?

Certainly; at least for a good number of years. I have heard gentlemen speak of arriving at information by taking an average over a period of years of each farm; now my impression is, that farmers could not at present give you that with sufficient accuracy: they have not been taking notes, and their observation has not been directed into such channels as would enable them to do so; but supposing this inquiry were going on for some 10 years, it would induce such habits of strict observation and inquiry as would then perhaps enable them to give you some average on which you might possibly work without yearly returns. I may mention, in illustration, that I have this year had to call the attention of farmers in some districts of Scotland very particularly to the importance of paying attention to and ascertaining the production of root crops by tonnage; they could tell you roughly what they have, but they have not been in the practice of weighing, or testing by weighing, which this inquiry may lead them to do, and in the course of some years you might perhaps be able to do without yearly returns; but I conceive them to be necessary now, either with a view to some future average as a substitute for a yearly recurrence, or with a view to familiarise the farmers' minds to the measure and its objects.

97. You are of opinion, if I understand you correctly, that although the most accurate returns possible might be obtained in the year 1855, it would not be wise to postpone the next return till the census is taken in 1861?

I think it would not; I do not see what object it could serve. I have already stated to Mr. Cardwell that I do not think it would save expense, unless you propose omitting estimates of produce, as well as returns of acreage, and in that your machinery falls to pieces. I know the trouble and labour it has taken to put it together; and if it is allowed to go to ruin, I should be very unwilling to go through the wear and tear of getting it all up again in 1861.

98. With reference to the schedule, as I understand it, the divisions of the acreage may be classed something in this way: crops for the food of man, and crops for the food of stock; do you think it is really important to have the subdivision of the crops which are grown for stock?

It is not so important, certainly; it would be very difficult, in some cases, to draw a distinction; oats, in Scotland, are the food of both stock and man. If we have no return of turnips, potatoes, mangoldwurzel, carrots, cabbage, flax and turnip seed, we should lose all information; first of all, as to the amount of land

land in tillage; and secondly, as to the nature of the tillage of the country, and of the rotations of the crops; and what would you gain? You would save a farmer the trouble of filling up four or five of these columns; he would still receive a schedule; Government would have to pay the postage, the enumerator and the office charges; nearly the whole cost, trouble and machinery would be in existence. You would merely send out a paper shorter by one or two inches, and save the farmer the trouble of putting figures into four or five columns.

99. Is it not the fact, that the more you subdivide, the less certain you are of accuracy?

I quite agree in that, but I do not call this subdivision at all; take the case of a farm which consists of 400 acres, and is upon the four-course shift. It is all the same to the farmer whether he gives you three or four of these shifts; it involves no subdivision to give the whole; it rather enables him to state his entire rotation, and obviates a division of it.

100. Earl *Doncaster.*] At all events, according to the Scotch system of management of farms, instead of making the thing more clear, it would tend to complicate it, and give rise to error?

I think so; and the farmers would say, you are giving information to the public, and simply to such men as millers, bakers and corn merchants; while you withhold from us what, in a professional point of view, is interesting information; I do not think the farmers would like it.

101. Is it not also the case in Scotland, that the green crop is one of the most important crops grown, and which, in fact, to a great extent, is considered the foundation of the other crops?

Yes.

102. Lord *Portman.*] Would it not be sufficient, supposing your returns included wheat, barley, oats, potatoes and roots generally, instead of subdividing them, and showing that a man has five acres of mangoldwurzel and 15 acres of turnips one year, and five acres of turnips and 15 acres of mangoldwurzel the next year?

I would instance the advantage of the detailed return in this way: mangoldwurzel is a crop only just coming into Scotland; we believe it is a very valuable crop for dairy districts, and we are watching how far it is on the increase. It is interesting to note what progress a new crop of that sort is making, and these are points which farmers like to see. If withheld, they would say, what is the good of such returns to us; they are restricted to the mere commercial view of the matter, as far as food goes. I think you would not only deteriorate the value of the returns, but you would weaken your hold upon the good-will of the farmers.

103. *Chairman.*] Would there be any great saving of time or expense, even if you were to omit those items in the schedules?

A little, but a very trifle.

104. Earl *Doncaster.*] With regard to green crop and the estimate put upon it by the farmers, is it not the case that agricultural societies publish themselves annually the extent of wheat and of green crops in their separate districts?

They do; and on the practice I would submit another reason why I would retain roots in the schedule; I would do so to counteract the erroneous ideas so many people derive from some of the very best of these publications. The most careful weighing and measuring of turnip crops exists in Annandale in Dumfries-shire, and there are some valuable tables annually published upon the subject. The public sees enormous weights per acre recorded, but overlooks that these apply to the best farms pitting their best fields against each other, and too often supposes them to be indicative of the average growth of turnips in the district. In Annandale, Mr. Elliot, of Hargrave, a very intelligent, clever farmer, happened to be in charge of the measuring and weighing of turnips, and at the same time to be the statistical enumerator. He sent me in his turnip report, and his estimate of the general average of turnips, and he said, you may think there is great inconsistency between them, but there is none. For you, I estimate everything, good land and good farming, bad land

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and bad farming; while for the local society's competition, we have to judge of the best specimens of our best farms; therefore, in order to counteract any exaggerated conclusions which may be and are drawn from such tables, I think it is not useless to continue the green crops as part of the statistical inquiry.

105. Lord *Portman*.] Your opinion is, that the schedule, as now reduced, is reduced as much as is expedient, with a view to ascertaining the supply of food for man, and giving the farmers valuable and interesting information in Scotland?

I do; I think the schedule is reduced to those two points. In reducing the schedule, we promote simplicity, and we avoid error, which to a certain extent the columns I have pointed out would have involved us in. I have been asked if I thought it should be kept as simple as possible. In Scotland, some of our farmers who are zealous in the cause would make the inquiry embrace other matters than these which are set forth in the schedule. Mr. Dudgeon would introduce the comparative feeding resources of different districts; others would bring in statistics of drainage; others, the statistics of special manures imported and used in the district; others would introduce the statistics of labour; some gentlemen are anxious to know the quantity of land turned into deer forests instead of sheep grounds. All these may be points legitimately belonging to this inquiry, and you may, from time to time, when we are fairly in the saddle, and when the farmer has become familiarised with the measure, then engraft new features which will convey interesting and important information. But, in the meantime, I have strongly urged upon the farmers, and the representatives of the Society, the importance of making it simple, and keeping it to the food question entirely, at present.

106. *Chairman*.] Are the Committee to understand from your answer to a former question, that you attribute a great part of the success which you have had in obtaining information from the farmers to the fact, that they have confidence in the person to whom they make the returns, and that you might not have been so successful if the person to whom they so sent those returns had been an officer of the Government, and not a person connected with a society in which they had great confidence?

That is a point upon which I would like the Committee to examine some other person than myself; it is an awkward question to put to me; if I have stated that strongly, I must correct it upon perusal. The Committee may judge by the fact, that we have had no opportunity of testing that the farmers prefer sending their returns to such a person as is described in the query, rather than to one of their own number; and it may be inferred whether they would have looked with most jealousy upon a Government official, or one of themselves. I need have no hesitation at all events in saying, that the farmers of Scotland have confidence in the Highland Society, and do not readily misdoubt the object which the Society has in view when it takes up a measure such as this; they rather infer that the object is for their advantage; therefore the secretary of that Society, if he does his duty, has facilities, perhaps, which no other person in Scotland possesses for working such a measure as this.

107. Lord *Monteagle* of Brandon.] Do not you conceive that the feeling of distrust and jealousy which may arise at the commencement of any system of procuring statistical information is likely to wear off, in proportion as experience shows that the information may be given without any of the evil consequences which have been at first apprehended?

Certainly, I think that a year or two's experience, if you could once get over the difficulty, would remove such distrust and jealousy; if you could once get them to make their returns all over the country, and if they once do it readily, the repetition will have less difficulty.

108. Conceding, for a moment, that the position of the Highland Society, and its officers, in connexion with the farming interest of Scotland, gives a very great facility for the introduction of a system of agricultural statistics, and at the same time supposing that no such Society existed, and that returns were called for, and that the system was managed with intelligence and good faith, have

have you, yourself, any apprehension that any mischief to the farming interests of Scotland would result from making such returns?

I know that no such mischief would result.

109. Assuming the existence of a conviction that no mischief would arise from giving the returns, do you see any difficulty of an insuperable kind in obtaining this agricultural information in countries where there are no Highland Societies?

No; I have said already, that if you once get them to do it, having done it, and having seen that it is perfectly innocuous, and that even if it does no good, it does no harm, they will not refuse to repeat it again; the difficulty is the first start.

110. You are aware that the Irish returns are procured through an organized establishment of the Government, namely, the Constabulary?

I have been told so.

111. If there has been no species of jealousy excited on the part of the agricultural interest in Ireland where those returns are made through the medium of the police force of the country, have you any doubt but that an organized system in England might be carried on which would lead to the same results of obtaining information, without causing opposition, suspicion, or jealousy?

I was not at all aware that the returns were made through the constabulary; I thought the information was collected by the constabulary. The Irish statistics, I understand, include very small holdings, so low as one acre; but if I am to measure the education and intelligence of Ireland by that of Scotland, it would, I conceive, be totally impossible to get direct information from such a class of persons.

112. If in a country circumstanced like Ireland, through the medium of the constabulary statistical returns of agricultural stock and produce, made with infinitely greater detail than you recommend, have been from year to year procured; is it your opinion that that furnishes any evidence as to the facility of obtaining agricultural returns in England?

I do not know; there are others here more competent to speak of England.

113. *Chairman.*] What is the mode pursued in Scotland for the purpose of ascertaining the corn averages?

The fiars, by which the ministers' salaries are paid; our rents are also frequently regulated by the fiars; sometimes partly, and sometimes wholly; I have them both ways myself. In every county there is a jury impanelled by the sheriff, who takes evidence as to actual sales over a certain period, and upon that evidence the price that is to regulate the ministers' stipend is fixed; I am not prepared to go into any detail regarding this system, but I may say that it has frequently been the subject of discussion, and does not, I think, work very satisfactorily. In my own county, Renfrewshire, it has sometimes so operated as to attach, in the same year, a higher price to second-class wheat than to first.

114. Do you consider that the return of prices which is so made is accurate?

I do not like it, and I do not think it is a correct system.

115. Does not it include all the sales of corn at particular markets?

No; a certain number of farmers are called forward in rotation, as a jury is summoned, to state what their sales have been over a certain period; how many bushels they have sold at this price and that price at different dates; I have not given my attention to the details, and I would rather that I was not taken as an authority upon them; I receive money and I pay money under the fiars, and I sometimes think the results are a little absurd.

116. Upon the whole, you do not think that the return of prices so obtained is very satisfactory?

I do not regard it as a valuable piece of statistics.

117. Earl *Doncaster.*] In fact, it is only for a few months in the year for which the evidence is given as to the sales, namely, between October and February?

Yes.

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118. *Chairman.*] Do you consider it important that there should be accurate returns of price as the sales are effected, and if so, in what mode do you think they could be best obtained?

I may say that in the answers I give here, looking to the success of a measure such as this, I have made it my endeavour to steer clear of all questions of price or value. It would, no doubt, be valuable for the country to have accurate returns of prices; but as regards the success of the statistical inquiry, I should be sorry to see anything put upon it, or connected with it, which at all touched the question of price or value.

119. Earl *Stradbroke.*] Do not you consider that it would be very important to establish similar weights and measures in the whole of the United Kingdom for corn?

By law they are the same; at least in Scotland we legally have only the imperial weights and measures; but we find it perfectly impracticable to extirpate the old weights and measures, though their use is contrary to law.

120. You think it would be difficult to extirpate the old weights and measures?

It has been found so in practice, but much confusion is created by adherence to them, and every effort should be made to extirpate them; legally, we have only the imperials.

121. That is not the measure generally used in public markets?

Yes, in public markets. Before concluding, there is one remark which I may perhaps be allowed to make: I may have been putting forward a little more strongly than I should have done the confidence which the farmers have in the Highland Society, and the efficiency of its officers. Whether I have done so or not, I may not have put in sufficiently bold relief the credit due to the farmers themselves in Scotland in regard to the success of this measure. I cannot take a better opportunity of stating, and, certainly, no person has better grounds for doing so than I, the great readiness, even sometimes against their prejudices and feelings, with which the farmers met me; I could mention repeated instances at large meetings in county towns, where I met an audience prepossessed against what I had to propose, yet on every occasion these men listened dispassionately to what I had to say, and very often put nearly as many questions to me as your Lordships have; and after satisfying themselves, the result was always the same, even amongst men who had come strongly tinctured against the measure. I think it is right and proper I should state in evidence, that very great credit is due to the liberal manner in which such farmers as were prejudiced received explanation, and acted upon explanation, and to the still more enlightened views with which the great majority regarded the inquiry from the first: without that, the thing must have been utterly unsuccessful, independently of the Highland Society altogether.

122. Earl *Carnarvon.*] I think you have stated that the disinclination on the part of the farmers to afford the information proceeded very much from a jealousy of communicating the details to their neighbours?

I meant to say, that in 1853 we found there was, in some instances, such an objection to communicate the details to their neighbours as in 1854 induced us to let them communicate the details to me. When I found people prejudiced against the measure, it was generally on the ground that they should not be interfered with; that it would do them no good, and possibly might do them harm; that it might be a landlords' question, with a view to raise rental, or a Government question, with a view to increasing the income tax. The Committee will appreciate objections such as these; but where there were such views originally taken up through misapprehension, they were very liberally abandoned whenever the matter was explained.

123. Are there not such things as farmers' clubs in Scotland?

There are farmers' societies and associations everywhere, and there is one circumstance which makes them peculiarly useful; they are characterised by the absence of one topic which is sometimes introduced in similar societies in England: in Scotland politics are excluded from the discussions in the farmers' clubs. We have a most admirable network of farmers' societies all over Scotland,

Scotland, and, from the nature of our connexion with them, we have been much assisted in getting up these returns.

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124. Do you attribute to the absence of political discussions at those societies the very ready co-operation they have lent you?
I have no doubt it has assisted us very much.

125*. Lord *Portman.*] Describe the connexion existing between the Highland and the Local Societies?
The nature of the connexion between those societies and the Highland Society is of old standing; the Highland Society has been about 80 years in existence, and at an early period it turned its attention to getting up and promoting local associations. With this object it established a system of district competitions, at which its premiums are competed for under the management of local associations; we thus not only assist these bodies financially, but as we regulate the competitions, their efforts are directed into proper channels, and the regulations and practice of the central society are gradually engrafted on their system. The result is, that after a long period of years there is a great deal not only of uniformity of object, but of action, between all these local societies and the parent society. There is no part of Scotland in which we have not had districts parcelled out and committees at work in connexion with our local shows, so that we had them to fall back upon for assistance and co-operation in conducting the statistical inquiry. I therefore attribute the successful organization of the machinery necessary to carry out the system in a great measure to the facilities afforded by these local associations, and by our long-established and friendly connexions with them.

The Witness is directed to withdraw.

Lieutenant-Colonel HENRY JAMES, R.E., Superintendent of the Ordnance Survey, is called in, and examined as follows:

125. *Chairman.*] YOU have turned your attention to the subject of agricultural statistics, and devised a mode by which you think they may be best obtained; will you have the goodness to state to the Committee what your proposition is?

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I should state first, that it is only recently I have directed my attention to this subject in connexion with discussions which have taken place as to the uses for which the national survey is required, and the purposes which it should subserve; I have, with this object, considered to what extent and in what manner the survey would be useful in the collection of agricultural statistics: first, I have examined a certain district of country, marking on the plan of it each separate property, and each separate tenement, and placing reference numbers in each field; we have then collected the statistics of a parish in the county of Edinburgh, and another in the county of Haddington, and these plans and schedules exhibit the result—(*producing a plan.*)—This is a plan of the parish of Glencross, in the county of Edinburgh, the boundary of which is engraved, and has been determined authoritatively under the provisions of the Act of Parliament, and we are thus enabled to register the exact acreage of this parish. I have sent some people to mark out the boundary of each property, which is distinguished on the plan by a number, and a tint of colour, and these internal lines mark the separate tenements; then I have the numbers arranged in the fields, and having the acreage of each field arranged in the schedule opposite to the number of the field, I am enabled to make up and account for every yard of ground in the parish; as, for example, in that column numbered 1, is the property; No. 2, is the farm; the third column represents the number of the field; then I have in No. 4, the acreage of each field; and of course, with these headings for the various crops, woods, plantations, mountain pastures, &c., including everything, even down to the foreshore, where there is any along the seashore; we obtain in this way the exact number of acres under each kind of crop, &c., on each property, and these added together of course make up the total to be put into a tabular abstract form. I conceive, if the Government survey which I am superintending is carried on in the way which is now proposed,

Vide PLAN at the end of App. A.

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posed, that this mode of collecting statistics may be rendered extremely simple, and done, in point of fact, with the assistance of such enumerators as Mr. Maxwell has alluded to. Perhaps I should further recommend the sending of some one or two persons to each county with a set of maps, to be furnished to those farmers who are employed to collect the statistics, for I entirely approve of the general arrangement which Mr. Hall Maxwell has described; I would still have the voluntary principle, but I would send a person to guide and assist those volunteers with the aid of these maps.

126. Lord *Monteagle* of Brandon.] What scale is this map?
Six inches to the mile.

127. Earl *Stradbroke*.] At about what expense per acre is this survey made generally?
At about 10 *d.* an acre, engraved as these maps are.

128. *Chairman*.] The mode you would pursue would be to send copies of those maps down, and trust entirely to the occupiers of land filling them up themselves?
They should be filled in by the enumerators, who would only have to put W. for wheat, O. for oats, B. for barley, &c. in the fields under crop. I should first have stated, that, as a preliminary measure (and I think it is a matter which should be brought to the notice of Parliament), we should be empowered to mark every property in the country—not to investigate title, we do not want to do that. I believe, from the inquiries I have made, and the experience I have had, that there would be no difficulty in obtaining the information as to property; there might be some in the uncultivated districts; but, in general, nothing would be more simple than to distinctly mark each property in the kingdom on the Ordnance Maps on the scale now adopted.

129. Earl *Stradbroke*.] What would be the advantage which you would derive from that?
The advantage would be, that you would make the survey as authoritative in future years as Doomsday Book or the Down Survey in Ireland is at this moment; it would become then the basis of legislation; it would enable you to make a subdivision of the parishes co-extensive with the properties, like the townlands in Ireland. With regard to some other points in connexion with this subject, I think that it would be very important in the discussion of the returns, after having first ascertained the actual amount of produce, which is the more immediate object, that there should be a discussion of the causes upon which the fertility of different districts depends. Those may be enumerated: first, the altitude at which in the different latitudes the crops can be successfully cultivated; in certain districts, and in different latitudes, for example, we know that the temperature diminishes one degree in about 250 feet in altitude, and about one degree for every degree of latitude; that between one portion of the country and another you have a variety of crops ripening in succession; and, therefore, although you can cultivate wheat, for example, at certain altitudes in a certain portion of the country, you cannot do so in another. We have the means, by these contours, which are engraved upon the maps, of very readily showing the belts or zones between the different altitudes—(*producing a map*). All that ground is under 500 feet; all this second tint is under 1,000 feet; all this is above 1,500. The 1,000 feet line just skirts and cuts off the cultivated from the uncultivated district in Edinburghshire, in latitude 55 degrees north; 500 feet would cut off all the cultivation in a more northern latitude; and you might, in a more southern latitude, go much higher. In the discussion of the results, I only suppose you have an accurate return of the actual produce; but it would be important, I think, to show in every county, and in the whole kingdom, therefore, that of the whole acreage certain portions are included in the zones between the contours at different altitudes, and the portions which are above the altitude at which it would be possible successfully to cultivate certain crops. Another point, I think, to which I venture to direct the attention of the Committee is this, that in the Government geological survey, which has hitherto been confined simply to distinguishing the great geological formations, such as coal formation, the extent of granite, and the like, it should be an instruction to the Government

Government surveyors that they should map the soils, or those superficial deposits upon which the character of the soil depends. I think that when the country is investigated in the detail in which it is by geological surveyors, you have a right to expect this. I may mention as an instance of extreme difference in districts, the maps of which geologically would be coloured identically the same; for example, a large portion of East Lothian is on a coal field; again, a large portion of the northern counties of England and the southern part of Wales are on coal fields; and in a geological map those districts are coloured alike. In the Lothians you have superficial deposits, such as the boulder clay, and drifts, and it is upon the soil derived from these that the fertility of the district greatly depends; whereas in the other districts, as in the north of England, it depends upon the sandstone of the coal measures, and the land is as barren as the heath at Aldershot.

130. You think, in the formation of a geological survey, there s huld be a double colouring, to indicate what was the nature of the superficial soil, and the nature of the strata underneath?

I do.

131. How do you propose to effect that?

By taking two sets of maps, one of which I would call the soil map.

132. There must be two distinct maps; you cannot in the same map describe the two?

I tried to do that.

133. Did you find it was impossible, upon the same map, to indicate the two?

It is extremely difficult to make each clear and distinct. I adopted afterwards the plan of having the superficial deposits drawn upon transparent paper, and laid one upon the other; and I got in this way the effect of double colouring without interference.

134. Could you, by means of dotted marks, or other marks, indicate the sort of soil?

It is quite possible to be done, although I was not successful myself; but as regards the contours representing the altitudes, nothing could be more easy, as I think the Committee will see, than to give the areas of the different zones, and we, of course, can very readily do so if instructions are given to that effect.—(*The Witness exhibits a third map.*)—The altitude to which cultivation can be carried is influenced by another consideration: for example, in most of the western counties which are exposed to the south-west wind charged with moisture from the Atlantic, at the same altitude there is less power of ripening crops, and you could not, therefore, in the west cultivate to the same altitude that you could in the east.

135. Lord *Monteagle.*] Would it be possible to transfer information of that kind to a map?

I am speaking of the discussion of the causes upon which the fertility of the different districts depends, and those are matters which should be clearly brought out.

136-7. Do not those vary within a very few miles of each other: for instance, in the mountainous country in Cumberland,—take Brougham as one station, Hallsteads as another, and Patterdale as another, in the course of a single lake, Ulleswater; you have a variation of moisture that will be in the proportion of one to three?

Yes; but it is a knowledge of the amount of rain which falls, and the temperature of the air, and its humidity in the different districts, which we require.

138-9. Lord *Monteagle* of Brandon.] You have suggested, in exhibiting to the Committee a map upon which the properties were set out, that a similar map should be sent down to the parishes or individuals locally interested, and that the boundaries of the properties should be ascertained and put down upon that map; do you think that would be a very easy matter?

I think it would, but it should not be done by persons locally interested.

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140–1. Are you acquainted with a proceeding of an analogous kind which has taken place in Ireland, in which, in addition to the local survey which gave the topographical features of the country, it was found necessary to add the boundaries of the properties as shown by townlands; do you know how many years that has been in progress, and what has been the expense of it?

I have had no immediate connexion with that department, although I was myself employed in the survey of Ireland, and am thoroughly conversant with the greater part of Ireland.

142. Are you aware that it was necessary, in order to show the boundaries of property in Ireland, to create an entirely distinct department, separate from the Ordnance Survey, the operations of which have been carried on at the public expense for a great number of years?

I am quite aware that a separate department was formed, but I never heard of the necessity of forming that separate department; in point of fact, in England and Scotland, we have no such separate department. At this moment we are determining the parish and township boundaries, and we have done so in four counties in England, and 12 in Scotland.

143. Have you determined the boundaries of property in such a manner as to realise the advantages which you have suggested, as connected with the map which you have exhibited to the Committee?

We have not done so as yet; I should anticipate very little difficulty in doing it, more especially if it be done after, and not before the survey was made, as in Ireland. The difficulty in Ireland was (the survey not being originally intended to be in full detail), that before we could commence the survey, it was necessary that we should know the boundaries. We have now precisely the reverse operation; we have a survey in full detail, and we merely want to know the boundary of the property; and there are, therefore, no boundary maps to be made, and no special department need be created.

144. Are you not aware that, owing to the minute divisions of property in England, the boundaries to be inserted in the survey of England are infinitely greater than the boundaries inserted in the Irish map?

In certain districts they are small, and it is for that reason that the Government has recently ordered a larger scale for the plans; and that they should be lithographed, and sold at very small prices.

145. Upon the 25-inch scale map, in the operations which the Government are carrying on in Great Britain, has it been in contemplation at any time to add the boundaries of properties?

I am not aware of what the Government may have contemplated, but it seems to me to be one of the most obvious and important things to do with regard to the registration and valuation of property.

146. Supposing it were necessary to add to the Ordnance Survey of England all the boundaries of property, would it not require a most laborious and most expensive process to be undertaken?

I do not see how it would be possible to add the boundaries of the properties to a one-inch map, upon which the properties could not be represented at all.

147. You have thrown out a suggestion, that maps executed in the way of which you have given the Committee a specimen would act as a sort of auxiliary to the returns of agricultural statistics, and you have given the boundaries of the properties as being essential to the scheme; how would you set about obtaining the boundaries of the property for that purpose, supposing it to be desirable?

The demarcation of the boundaries of tenements is not essential to the scheme as I have proposed it; but inasmuch as I think that the boundaries of properties should be marked, and the statistics afterwards taken in reference to the properties, I think it would give very much greater value to the statistics, and it would be a legitimate use of the survey to show all the properties; and this, I think, can be easily done.

148. Supposing

148. Supposing it were possible, which as yet has not appeared, that the boundaries of property could be added to the Ordnance Survey, how would you provide for the constant fluctuations of the boundaries of properties which take place from day to day by sales, by exchanges, by subdivisions, and by bequests?

If the survey is once made, as it now is made, with all the details of the properties marked upon it, I do not apprehend that in the next 100 years there would be any great change in the properties; they might change hands 50 times, but the properties are generally sold as a whole.

149. Supposing there had been an Ordnance Survey completed of that township which you exhibited to us as a specimen of the alterations made in consequence of an inclosure, and that the original Ordnance map had comprehended only the external boundary of that township when it came to be subdivided in the manner in which you have pointed out, coloured red and yellow; would it not be necessary, in order to get all those boundaries inserted upon the map, to go to the expense of an entirely new survey for the purpose?

The external boundary would remain unaltered, and the Commissioners would insert the internal divisions. I sent a party of surveyors from Edinburgh to Aberlady; they marked all the boundaries of the properties in that parish; and, speaking from memory, I think the expense was less than 1 *l.*

150. For how many acres?

It was a whole parish.

151. Were there previously to that no boundaries marked at all?

We had no boundaries marked, but we had every single fence and every drain, and we found out the boundaries by consulting the proprietors and tenants.

152. Did not you find a difficulty in ascertaining the boundaries of the property?

No; and I am quite satisfied, if his Grace the Duke of Buccleugh would allow me to mark upon the survey the boundaries of his Grace's different properties in Edinburghshire, and the boundaries of every farm on them, I would undertake to have it done by this day week, and that all the neighbouring proprietors should acknowledge it to be correct.

153. *Chairman.*] I think in your plan there is no provision made for the quantity of land occupied by roads, hedges and ditches; would they all appear in your plan as a portion of the fields?

The area of the roads is given separately; but in taking the statistics, it would be necessary to deduct, on account of the fences, a per-centage, depending upon the size of the inclosures, which we should do by estimate. If a portion of the map of Ireland, for example, were put down by the map of Scotland upon the same scale, you would see that they had ten fields to one in Scotland; consequently the quantity to be deducted from a certain given number of acres would be very much greater in the one case than in the other.

154. According to the nature of the fence, a larger quantity would require to be deducted, would it not; for example, in the case of a broad copse?

It would require an average per-centage to be deducted, but the area of a broad copse would be given separately.

155. Supposing a field to be occupied by two descriptions of crops, a portion of one crop and a portion of another; how, in such a case, would you obtain an accurate return?

That, I think, might with sufficient accuracy be taken by the eye. If you have a field of 30 acres, and you see that two-thirds, or about two-thirds, are in one crop, and one-third in another crop, in such a case as that you could not be wrong, except by so small a fraction as not sensibly to affect the return.

The Witness is directed to withdraw.

Sir JOHN WALSHAM, Baronet, one of the Poor Law Inspectors, is called in, and examined as follows:

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156. *Chairman.*] YOU have been engaged in the collection of agricultural statistics during the last year, and also the year preceding?

I have.

157. Will you state to the Committee the course which you pursued in each year, and whether any alteration has been made during the last year?

In 1853 the President of the Poor Law Board asked me whether, in my opinion, agricultural statistics could be collected in Norfolk (Norfolk being the county then specified), through the agency of Boards of Guardians. Without raising any question myself, which I was not called upon to do, as to the abstract propriety or expediency of collecting agricultural statistics, I gave an unhesitating opinion that, through the agency of Boards of Guardians and their officers, agricultural statistics might be collected with less friction, and certainly at much less cost than by any other means that were known to me. I however requested permission to inquire of the chairmen of the Boards of Guardians in Norfolk what their view of the question was, and, as far as I remember, they were quite unanimous upon the point; certainly, two or three chairmen suggested modifications, but, as to the principle, they seemed agreed that it could be carried out, and, consequently, at the request of the President of the Poor Law Board, the then President of the Board of Trade (Mr. Cardwell), and your Lordship, I prepared certain papers—certain schedules—founded in a very great measure, so far as they could be founded, upon Mr. Hall Maxwell's excellent schedules for Scotland. In the first instance I addressed a letter to the chairmen, which is to be found at page 10 of the Reports published in 1854 (to which Reports, and my supplementary Report, I should wish generally to refer the Committee), suggesting to them the appointment of statistical committees by the Boards of Guardians, and other arrangements. The schedules for 1853 were pretty nearly the same as they appear in the Reports published in 1855, pages 17–23; but there is one point which (as it occurs to me now) I should like to mention. In the Instructional Letter, which was issued in 1853, there is a paragraph (marked 12, at page 11 of the Reports for that year) which seems to me to bear upon Mr. Maxwell's evidence with regard to farmers preferring to send their schedules to some other persons than their neighbours. In this paragraph I stated, "Sir John Walsham expects, with much confidence, that the farmers of Norfolk will not refuse information sought from them solely in the public interest; but should the relieving officers or enumerators, though backed by the influence of the statistical committees, meet nevertheless with positive refusals to fill up section No. 2 of Schedule A." (which was the section referring to stock; for there did not at that time appear to be so much objection regarding the acreage of crops as to the section regarding stock), "then the alternative proposed in the observations endorsed upon Schedule A. (at page 12) should be urged upon the recusants." Those observations were to the effect, that "should any occupier object to communicate his return of live stock to the appointed enumerator, Sir John Walsham requests that, in that case, he will have the goodness to separate the parts of the schedule, numbered 2, from the foregoing part, and to transmit the former (viz. the return of live stock) by post, addressed to Sir John Walsham, Bart., Bury St. Edmund's, before the 10th day of November." Now, I got, I think, only eight or ten out of a very large number of schedules, so that the alternative then offered to the farmers of withholding all knowledge of their stock from their neighbours did not appear to have found very much favour in their eyes; in short, there did not appear to be that objection on this point which had been elsewhere anticipated. It was also stated in the same paragraph (12), that, if they liked it, two, three or more farmers of the same parish might enter the gross amount of their joint crops and stock on one schedule, so that the exact manner in which any one farm had been cropped and stocked would not be indicated; but nobody availed himself of that alternative; and in 1854 this part of the original scheme was left out altogether. I should also state, that

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one of the material differences, in fact, perhaps, the only material difference, between the schedules used by Mr. Maxwell in Scotland, and those used in Norfolk and Hampshire for 1853, was, that we have in England the means of preparing a schedule (which may be found at page 14 of the original Report), called Schedule B. In Scotland, however, they have not the same means of proving the returns that we possess through the rate books; and by the preparation of this Schedule B., or parochial schedule, I insured that the whole acreage of every parish would be so accounted for, that when the classifier returned the schedules to me, I should find all the Schedules A. (or the occupiers' schedules) summaried in Schedule B., at the foot of which the enumerators were bound to show whether any and what portion of land was unaccounted for in Schedules A. This appears to me to be a valuable schedule; for it certainly compels the enumerators to exhaust the acreage of each parish; but I apprehend that in Scotland there are no means for providing that test of correctness.

158. Did you find, in the course of the last experiment, that the indisposition on the part of occupiers to give the necessary information had increased or diminished?

I should say it had greatly diminished in the localities where it was chiefly manifested in 1853. I do not think the whole of the returns were worked up better in 1854 than in 1853; but, as far as I remember, there are, in the last return, a greater number of schedules accounted for than in the first return from Norfolk. There were not quite so many schedules in proportion filled up throughout the county by the occupiers themselves as there had been in the previous inquiry; but nevertheless, in certain unions, the guardians of which had refused altogether to have anything to do with the experiment for 1853, no opposition was encountered in 1854. The Blofield Union was one, and the Downham Union another; Blofield lying upon the east, and Downham upon the west side of Norfolk. These Boards of Guardians, in 1853, refused positively to have anything to do with the experiment, and I had to employ upon that occasion a special enumerator in the Blofield Union, because I was willing to try every agency that could be used for the purpose, even though at a much greater cost than would have been necessary under the other scheme. So also in the Downham Union, I employed the special agency of the clerk. In the Blofield Union I no doubt got a very good return; but from the Downham Union, and notwithstanding the clerk's influential efforts, a very bad return. Yet among the two first Boards of Guardians that came into the scheme for 1854, were the Downham Board and the Blofield Board. So that, in point of fact, as far as this illustration serves, there has been a diminished hostility in Norfolk, comparing 1854 with 1853.

159. To what do you attribute the indisposition on the part of those Boards of Guardians to furnish the information required?

It is difficult to say: I think there were various causes which contributed. In the Blofield Union, the only reason courteously assigned to me was, that the Board of Guardians had not the time to give to the consideration of the scheme, and that they did not think their officers could be beneficially employed in it. In the Downham Union, I believe, the guardians said they would not give any returns of the kind required; they thought them inquisitorial, and involving matters the Government had no business with: Government (it was observed) might as well ask what was a farmer's balance in his banker's hands, or how many bottles of wine he had in his cellars; and so that Board refused altogether to give their aid in 1853. Those reasons, however, do not appear to have weighed with them upon the recent occasion, because, as I have already stated to the Committee, the returns for 1854 have been fully furnished by these guardians and their officers.

160. Do you consider, generally, that that indisposition which existed was an indisposition arising from the fear that it would be an interference with their private affairs, showing up the state of their farms, so as to be the foundation for additional taxation, or from the fear of interference on the part of the landlord?

 Undoubtedly

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Undoubtedly those were the reasons oftenest mentioned, but less frequently, I think, with regard to interference on the part of the landlords than on that of the Government, who meant (they declared) to build some unknown system of taxation upon the scheme; and, generally, from a sort of feeling which prevails strongly amongst English yeomanry, they did not like to have any interference with what they considered their private concerns.

161. On the other hand, did you find on the part of the more enlightened farmers and persons engaged in agricultural pursuits a disposition to admit the importance of producing accurate agricultural statistics?

As far as I had the opportunity of judging and hearing, that disposition was very largely felt, and especially by the most intelligent farmers. Indeed I think this fact was established when, after the recent inquiry in 1854, for both Suffolk and Norfolk, 93 per cent. of the acreage was found fully accounted for; and yet (aggregating the two counties) there were over 2,000,000 of acres to be enumerated and classified. Moreover, on turning to page 38 of the Reports for 1854, it will be seen "that 26,142 schedules, or 92 per cent., have been duly filled up by the occupiers themselves, or by the enumerators, from perfectly reliable sources, in the proportion of 77½ per cent. by the occupiers, and 14½ per cent. by the enumerators." There were certainly unions in Norfolk, for instance, the Guiltcross Union (which made a very bad return in 1853, and which has made a very bad return on the recent occasion), and the Wisbeach Union (which was not included in the experiment in 1853, but which has a large portion of land in Norfolk, called marsh land, where the farmers are persons of strong opinions), in which two unions we failed altogether in getting a satisfactory return for 1854. But subtracting those two unions from the 19 rural unions of Norfolk, and speaking only of the remaining 17 unions, the information which was not obtained on the recent occasion was less than the failures on the previous occasion; and therefore I think it may be said that the experiment for 1854, so far as Norfolk is concerned, was quite as successful as could be expected. The two unions which I have just named certainly increased considerably the per-centage of refusals of information; but on referring to the return from the West Riding of Yorkshire (of which, as might be anticipated from the locality, it has been said very justly that the returns are nearly perfect returns), in these West Riding returns it will be seen, at page 91 of the recent Blue Book, there were only 7-10ths of 1 per cent. blank for 17 unions. Comparing, now, the 17 unions in Norfolk, of which I have spoken, the result will be much about the same thing; in other words, their blank returns were less than 1 per cent.: I did not go into the exact fractions, but, speaking off-hand, I should say they were not more that 7-10ths of 1 per cent. In Suffolk, on the other hand, the experiment being new, the proportion of refusals was considerably greater; but even there, when you take off the four unions in the west of Suffolk, viz., the Cosford, Mildenhall, Samford and Thingoe Unions, in which the inquiry failed, the number of schedules in respect of which no information was obtained would only be 1½ per cent. I therefore hold that, as an experiment, the Suffolk inquiry also was on the whole very successful.

162. Do you consider that the returns obtained in 1854 were more accurate than those obtained in the previous year?

I think so; I am hardly able to give a reason, but such is my impression; probably the officers, especially in Norfolk, were more accustomed to the work; and the modifications of the schedules, which were suggested by the experience of 1853, perhaps contributed to greater accuracy. I have no doubt also in my own mind, that the approximate returns which were obtained by the Boards of Guardians were not less accurate than those obtained from the occupiers. I do not think there is any ground whatever to suppose these approximations were inaccurate.

163. In considering the question, is it your opinion there would be any other mode of collecting agricultural statistics which would be more satisfactory or agreeable to the farmers than through the intervention of the Poor Law Guardians?

I am not aware, myself, of any; it strikes me that, *à priori*, as the Boards of Guardians should and generally do consist of the gentry and principal farmers of

of the district, no agency could furnish those returns so unexceptionably as they would do. This, in my opinion, is quite certain with regard to the officers employed; at the same time I do not at all propose, and I have never proposed, that the relieving officers should be invariably appointed. Where a Board of Guardians may say (with some reason in winter) that relieving officers have quite enough to do without attending to this particular business, it is perfectly competent to them to employ (as did the guardians of the Blything Union) other enumerators. There is nothing to prevent that being done; and consequently it seems to me still, that the best available machinery is that of Boards of Guardians, whose clerks and relieving officers are generally very intelligent persons. Perhaps your Lordships will permit me to say here, as it is better the Committee should hear the opinions of more practical persons than myself upon the question, that one of the best returns that were made in 1853 was received from the Aylsham Union, which is an important union in Norfolk, containing 46 parishes, and of which I particularly remember this, that an estimate made by themselves demonstrated (to their own great surprise, I believe), after the statistics of 1853 were collected, that the live stock at that period, if it had been sold up, would have been 1,500,000*l.*, and the dead stock about 900,000*l.* more; an amount of capital invested in agriculture of which the investers themselves appeared to have little notion. Partly, then, because the Aylsham returns were extremely well made; partly because the leading guardians were very intelligent men, and their officers good; partly because this union was in the central part of the county; and partly because their return was the first made; I requested them (previously to my preparing the Supplementary Report of 1854) to state candidly what, after working this question by the machinery which had been placed in their hands, their opinion upon the matter was. By way of reply they transmitted to me resolutions to this effect: "The (statistical) committee are of opinion, that no better mode of obtaining the information required could be adopted, nor can they suggest any mode by which it can be done with greater economy, regard being had to the important point of the correctness of the returns. The relieving officers and the clerks have, or ought to have, more local information as to the unions for which they act than any other person in it; and the habits of business and intelligence which they are presumed to have, render them the persons best qualified to ensure the correctness of the returns to be made. In the opinion of the committee, the details are simple and understandable by all parties concerned; the only difficulty here has been the time of taking the returns in respect of the stock." In 1853, I should observe to the Committee, there was a great objection, which objection was renewed also in the present year, to the time for ascertaining the amount of stock, as July was not the period which would give the best idea of the stock-farming of Norfolk, since the farmers of Norfolk had less stock at that time than at any other period, the beasts being generally bought to fatten for market by November. It was urged either that there ought to be in fact two returns, or that the stock return ought to be postponed. Of course, if we take only one county, this objection would be a valid objection; but these arrangements, as I have represented to those who have spoken with me upon the subject, were framed in contemplation of seeing whether they could be made the foundation of a general experiment for the whole of Great Britain; and if acted upon then, whatever period you fix for your return—say, as Mr. Maxwell has said, the 1st of July—you would have all the stock of England and Scotland returned somewhere or other, although you might not show it to the best advantage for particular counties. It was therefore in reference to this objection that the Aylsham Guardians go on to say, "The only difficulty here has been the time of taking the returns in respect of the stock; but should the returns be taken from the whole of Great Britain and Ireland, it could make no difference at what time of the year they were collected, as all the live stock would be returned somewhere. It might (possibly) be desirable to ascertain the mode of cultivation of each farm, which might be done by a slight addition to Schedule A.: by this means it could be easily ascertained what is the difference in the amount of the live stock produced by each system. No existing agency would, in the opinion of the Committee, be so well qualified to collect this information as that now employed: if any other, such as Constabulary, Excise or others were employed, there would be a

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jealousy, which would interfere with the willingness of the parties to make returns; added to which, there would not be the same amount of local information to enable the enumerators or classifiers to correct errors, either wilful or negligent; nor could the work be done, in the opinion of your committee, with greater economy than it has been in the present case. The committee must again say, they consider the correctness of the returns a matter of paramount importance." I subscribe entirely myself, so far as my opinion is worth having (*valeat quantum !*) to these resolutions; in connexion with which perhaps I may mention some resolutions of the Halesworth Farmers' Club; a club well known to Lord Stradbroke. The Halesworth resolutions were not sought for by me, but were transmitted to me, and, as they are brief, I will, with the permission of the Committee, read them. As to the question of collecting agricultural statistics, they state, "That in the opinion of this club, the collection of agricultural statistics would be a great national benefit." (I should have premised that the Halesworth Farmers' Club is in Suffolk, and that as, in 1853, Suffolk was not included in the scheme, these resolutions were passed with reference to what was doing in Norfolk); and they add, "That to obtain the necessary accurate and minute details, no cheaper or more effective plan can be adopted than a somewhat similar mode recently put in operation by Sir John Walsham, Bart., in certain unions in the county of Norfolk, viz., the agency of parish officers and Boards of Guardians." They proceed, however, to suggest, "That to remove existing prejudices to the proposed measure, and all personal objections to affording the required information, parochial returns should be made in the aggregate, through a parish officer, to the Board of Guardians, and the parochial schedule filled up, without particularizing names or farms, 'The return in totals of the parish of A;' and (so likewise) by each union in the aggregate to the county return. That the 21st of October would be the most suitable period for making the returns, including the probable yield. That all the expenses attending these returns be paid by Government." Those were the resolutions adopted by the Halesworth Farmers' Club. When, therefore, we came to the inquiry of 1854, and Suffolk was included in it, I was not at all surprised to find that the plan which the members of the Halesworth Club had suggested was carried into effect in the Blything Union (in which Halesworth is situated), in the inquiry which we have recently completed for 1854. In furtherance of this plan, the Board of Guardians undertook to conduct the experiment; a statistical committee of guardians was formed; and the clerk, who happens to be in that union, a very valuable officer, was appointed classifier; but parochial enumerators were appointed for every parish, and Schedules A. were never seen by the Board of Guardians. I had found it necessary, from the experience of 1853, to add to the schedules of 1854 what was called an auxiliary schedule or book, which the enumerators took round with them, and which was an exact duplicate of Schedule A.; so when they got those schedules, they entered the results in their auxiliary schedule. That auxiliary schedule was almost exclusively used by the Blything enumerators; with it they went round and obtained from the several occupiers all needful information; from that information, so obtained, the parish Schedule B. was supplied; and I apprehend that Schedule B. was the only schedule which the Board of Guardians saw; consequently, by that means the objections of the individual occupiers were obviated. There appeared moreover to be no objection, as far as I could make out, to that plan of operation, on account of what had been mentioned as a serious objection before; viz., neighbours knowing anything about the returns, for the parochial enumerators of course were persons connected with the parish. In some instances the parochial enumerators either failed in procuring, or they declined to procure certain returns; and then, I believe I am right in stating, the Board of Guardians fell back upon the relieving officers, and employed them to collect in those returns. "The result of the operations," as is observed in my last Report, at page 36, "was extremely satisfactory. The Blything Union comprises (using whole numbers) 49 parishes, 92,000 acres, 28,000 inhabitants, and 1,287 occupiers of more than two acres of land; 41 enumerators, including relieving officers, were employed; and of the 1,287 occupiers, 1,253 supplied voluntarily the full information necessary to the due preparation of the auxiliary schedules. For the 34 occupations, from which information was refused by the holders, approximate schedules were filled up from reliable sources by the enumerators."

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The statistical committees and Boards of Guardians, as I have already remarked, can always come to a very accurate knowledge as to whether those approximate schedules are correct or not; I never found they had the least doubt on the point. In all such cases the practical men of the several unions have assured me repeatedly, that the returns furnished by the enumerators were perfectly reliable and truthful; and by this means, in the Blything Union, the returns of the 34 occupiers who, out of 1,287, declined to furnish the information were satisfactorily filled in. Thus, then, in the Blything case, Schedules A. were seen by nobody but the parochial enumerator; nothing but the parochial schedule was furnished to the guardians; though it will be remembered that the parochial schedule, according to the plan I had devised, compels the enumerator to exhaust, by the details of Schedule B. every acre of land in the parish. In another union, the Mitford and Launditch Union, there was a good deal of objection also to the publication of the returns; there was, nevertheless, no objection made there to sending in the schedules to the statistical committee, which comprised some of the large landowners as well as the large farmers of the district, but they did not wish them to go any further. An application was, in consequence, made to me, both in 1853 and 1854, as to whether there would be any objection to the statistical committee destroying Schedules A., and whether I would receive Schedules B. upon their authority: no objection was taken, and Schedules A. were all destroyed. That was, therefore, another mode of getting rid of the jealousies and suspicions of the occupiers; and other similar precautions could doubtless be taken; but still, for all those precautions, and although we should always get, by the means we have been employing, and probably by other means of a more expensive nature, a very large proportion of returns under the voluntary system, I do not think, as far as my experience goes, and my opinion goes, we should obtain (at all events for some years to come, and I should fear never) a perfectly complete return by this voluntary system; which operates also unfavourably upon those who are otherwise willing. Many a man says, "I think these are very valuable returns, and I shall be very glad to contribute my share to them if they are made perfect; if the scheme, in short, be made *teres atque rotundus*; and if everybody supplies his quota of information; but if my neighbour A. and my relative B. are to be at liberty to refuse information, I do not see why I should bother myself by giving it." I am, therefore, driven unwillingly to the conclusion which I have expressed in my last report (and in glancing at the reports of my colleagues, I see they all arrive at the same conclusion), that there should be a compulsory power—in the background, at all events—to ensure the completeness of the returns.

164. What will be the nature of the compulsory power which you would propose; would you propose a penalty in case of not making the returns?

The actual details of a penalty I confess I have not considered; I conceive the Act should be conditioned similarly to the Census Acts; it should be analogous to those Acts.

165. Do you think the knowledge of the existence of such power would be sufficient to induce them to make the return, and that probably you would hardly ever or never have to enforce such a power?

That is distinctly my impression. I have often heard from persons who have refused to make a return, that they did not consider the mode of proceeding constitutional; that if it was laid down by the Legislature as compulsory upon all to give returns, they would be also willing to do it; but that until this was so, they should not give them either to that officer or the other officer.

166. Earl *Stradbroke.*] Do you think it would be desirable to give compulsory power, in case it were necessary, to the Boards of Guardians?

I think it should be made compulsory upon all persons to furnish information to those who are appointed to collect agricultural statistics; assuming the Boards of Guardians to be the agents for collecting those statistics, of course they ought to have the power to enforce the collection.

167. Lord *Berners.*] Would there be any objection, if the Board of Guardians were not made use of as the medium, to make it compulsory upon the church-

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wardens to make this return; I understood you to suggest a joint return for the whole parish by the classifier, doing away with Schedule A.?

I am always rather fearful of considering other plans; I know many plans have been recommended, but on all occasions I have merely regarded myself as having been asked to state whether I thought agricultural statistics could be collected by Boards of Guardians: I would not venture to state that agricultural statistics could not be collected by other agencies. As far, however, as I see my way, I believe that Boards of Guardians form an admirable machinery for collecting agricultural statistics, and I have not looked much beyond them: I think, from one or two causes over which, individually, I had no control, that we began both in 1853 and 1854 too late in the year to collect these agricultural statistics: and the relieving officers possibly were not always the proper officers, under such circumstances, to be employed; that is to say, we fell to work in the winter months, at the very period when the relieving officers' duties, and the duties of the Boards of Guardians, are most onerous; my proposal, however, after consultation with Mr. Hall Maxwell, was, that all this work should be begun on or about the 1st of July, when the harvest has not come on, and when pauperism is at the lowest ebb; when the relieving officers, therefore (if Boards of Guardians choose to employ them), have comparatively little or nothing to do. The relieving officers, again, are paid public officers, whose whole time has to be given up to their public duties; if, consequently, in the opinion of the Boards of Guardians, their immediate superiors, these officers can find the time necessary to do this statistical work, you do not in any way infringe upon any private speculations for which they might otherwise have required the use of their time, and, being paid officers (as I have said), they can afford to do the duty at a less cost than any other persons could, in addition to the advantage of their being intelligent men, and men well known in their locality.

168. *Chairman.*] If the Committee understand you, in your opinion there is nothing which appears to be inconsistent with their duties, either as guardians or relieving officers, to enable them to collect this information. Are they also to understand it is your opinion that there is nothing in their being so employed which indisposes the people towards them as relieving officers or as guardians of the poor?

I confess that is my opinion.

169. Earl *Carnarvon.*] You think there is no aversion on the part of occupiers of land to become, in some sort, a subject to be treated by Poor Law officers?

If I understand the question correctly, I should say not; I do not of course mean to say—I unhappily know quite the contrary—that there is not a great objection on the part of certain persons to furnish any returns at all, or that such persons will not object to the relieving officer as the person appointed to collect these returns; but to him, *qua* relieving officer, I do not think they object; in fact, this particular objection has not come within my knowledge at all. But perhaps I might be allowed to state to the Committee this (others no doubt have done differently), that I have avoided, as much as I possibly could, putting myself prominently forward in the advocacy of this measure; I may not therefore have heard of every objection. I placed all the papers and documents before the Boards of Guardians; I answered all letters, and they were many; and I conversed with those I chanced to meet on their objections. I endeavoured then, as much as possible, to leave the guardians themselves to be the persons to obtain the results desired; and I think that, upon both occasions, in 1854 as well as 1853, looking at the fact that there was a great deal of prejudice against these returns to be overcome, that very successful results have been obtained from Norfolk, and generally from Suffolk. In three or four unions in one county, and one or two unions in the other, there has been a refusal of the information sought; but this must not be allowed weight against the proceedings of the great bulk of those farmers and owners of land in the district who undoubtedly made their returns in a very liberal and kindly manner. There may have been, I would repeat, objections of the nature suggested by the last question, but they did not come within my cognizance; I did not hear of them; and, answering to the extent of my knowledge, I can only

only again say, that I did not hear any objection taken to giving the relieving officers, *qua* relieving officers, the returns asked.

170. Earl *Stradbroke.*] In the district in which you have the care of the poor, is it not the case that pauperism is very slight, even up to the 1st of November?

Unquestionably. My opinion, with respect to the agency of Boards of Guardians in the collection of agricultural statistics, has always rested upon this, that I did not think Boards of Guardians and their officers should be set to work upon these statistics at the period of the severe pressure upon their time which commonly occurs in winter; but unfortunately upon both occasions we fell across that period. I am bound, however, to add, that even under these unfavourable circumstances I never heard of any instance of neglect of the poor, or other neglect of their important duties, attributed to the relieving officers in consequence of their employment to collect agricultural statistics.

171. Lord *Portman.*] I have read in your report a statement of the meeting of the Framlingham Farmers' Club; I see that Mr. Peirson made a very elaborate address to the farmers: who is Mr. Peirson?

Mr. Peirson is the chairman of the Plomesgate Union, and I presume I shall not be wrong in designating him as a gentleman farmer; a gentleman of property, who farms very extensively himself, and is an agriculturist of considerable reputation in his neighbourhood.

172. Upon the whole, you would say that the statement he has made is one which your opinion would rather tend to confirm?

Undoubtedly; I concur almost in every thing contained in Mr. Peirson's statement; I have a very great respect for him; I believe him to be a very valuable practical man; and I think his address, which I have appended to my own report, is most useful, as showing the opinion of a person who is conversant both with the feelings of the agriculturists of his district, with the circumstances under which Boards of Guardians work, and with what the relieving officers can do or cannot do. The Plomesgate Union is a populous union, employing three relieving officers.

173. If I understand Mr. Peirson's view correctly, he rather leans to a quinquennial return than to an annual return?

Just so.

174. What would be your observation on that?

I confess that my opinion in regard to that has been very much in accordance with Mr. Maxwell's; I have had doubts whether, if you make these returns quinquennial, you can escape employing a certain annual machinery besides, and whether you would have the information you want as accurately as you would have it in an annual return. Mr. Peirson, your Lordships will observe, like myself and like Mr. Hall Maxwell, thinks that the really material feature in agricultural statistics is the basis they supply for obtaining estimates of produce. The facts which you obtain are valuable facts; but it strikes me they are valuable only as the foundation for obtaining estimates of produce. The returns of acreage, crops and stock are interesting as statistical curiosities; but they are no more. Now the difficulty is to see where you are to start from: that is to say, whether the particular year which you commence with is a year which you can take as a fair average year. Mr. Maxwell has very convincingly stated to the Committee that if we had taken 1853 or 1854, either year must have been wrong as regards the average; therefore it seems very difficult to settle the starting point properly and correctly; if, however, you can do that, I think that to the quinquennial period in England, where you have the machinery of unions ready made, the same objection does not apply, which applies, as Mr. Hall Maxwell has shown very forcibly, to Scotland. I believe that, in respect of the Plomesgate Union, Mr. Peirson establishes in his paper that the Government would only have to pay 2*s.* 2½*d.* per parish annually, if the guardians were to make their returns (which, theirs being a forecourse shift, they would easily do) once every fifth year only. There would not, Mr. Peirson urges, be much variation in the intervening years. I think there is a great deal of force in that; and I am not now prepared to say, balancing the amount

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of economy which would be produced by its adoption in England against its disadvantages, that Mr. Peirson's suggestion is not practically valuable.

175. Your opinion, if I understand you, is that you will obtain no valuable result in England without some degree of compulsion?

I am clear in my own mind upon that point.

176. Would it be advisable in passing an Act of Parliament to compel certain returns, according to the schedule in that Act, to be made once before any further proceedings are taken upon it?

I suppose the question to mean this, that if it should be deemed desirable to try a further development of the present voluntary system, we might first proceed to ascertain what would be the effect of a little compulsion, in the hope that having once done so, if we then returned to the voluntary system we should not meet with the same difficulties as we now do. If, however, we were to try the experiment again in Norfolk and Suffolk next year, precisely as we have done this year, and without compulsory powers, my notion is that we should meet with less opposition. I think the illustration I have drawn from the Downham and Blofield Unions is strongly in point. There the opposition of 1853 disappeared in 1854. So, likewise, I think we might hope that in some of the Suffolk Unions, from which similar opposition was encountered this year, there might be a great diminution of opposition next year. And so, likewise, I think opposition would be still further diminished by the process just suggested; but I am afraid that there will always remain a residuum of opposition, unless there were the means of compulsion to be seen in the distance: certain persons will always object to making returns. It is impossible to analyse all the motives influencing a man's mind in these matters. I have known myself—it has been within my own knowledge—that perhaps three-fourths of a certain number of farmers would make the returns if left to themselves; but when they get together, say at market, with the other fourth, who will not hear of making any returns, the passive majority are sure to be led by the active minority to withhold the returns they might otherwise have given.

177. Have you in your mind any schedule which you could suggest that Parliament could fairly compel the parties to answer, always bearing in mind that the moment you compel, it is under penalty; and when you come to enforce the penalty, you must know precisely for what that penalty is to be enforced?

It is a point which I have not considered with sufficient attention to enable me to give an answer which could be relied upon. I can, myself, see no reason at present why the schedules which have been tried in 1854, which were an improvement upon the schedules of 1853, and which, as far as I am aware, were in themselves unobjectionable, and unobjected to, should not be appended to any Act of Parliament relating to agriucultral statistics.

178. You would not suggest the omission of any item in those schedules?

No; I entirely concur in the answer which has been given by Mr. Maxwell, that if you call upon the farmers to make the returns at all, it will give them very little more trouble to fill up the several columns comprehending the usual crops which are cultivated in any particular district. It struck me also, when Mr. Maxwell was asked with regard to the enumeration of turnips, and of roots generally, that after all, these crops might be considered as food for mankind as well as for beasts, because they are sure to be converted eventually by certain natural processes into meat; supposing, however, an Act of Parliament to be drawn, it would probably be very desirable that the different schedules should again be looked over with a view to corrections; but I know of nothing whatever in them which would indicate why they should not be appended to the Act. In looking at Mr. Peirson's address, I am reminded that he is desirous that the 20th of October should be the period at which the guardians, or their statistical committee, should meet for the purpose of preparing the estimates of produce. My opinion has been hitherto, and still is, with Mr. Hall Maxwell, that this period should be rather fixed for the 20th December, or shortly before Christmas, with a view to transactions in the market for the whole of Great Britain. I have not looked so much at the proceedings on the farm which might result from the publication of the estimates in question, as at the transactions in the market. Mr. Peirson gives, nevertheless, good reasons for fixing the 20th

of

of October as the period of consideration, at page 48: "I have fixed the 20th of October (he states), as, upon an average of seasons, before that time some parcels of corn are thrashed, the poor allotments, gleaning corn and seed wheat are also often thrashed; so that the practical farmer may have before him complete evidence upon which to form a judgment as to the yield of the harvest."

179. *Chairman.*] Do you think it would be practicable to have any earlier return of the quantities of acres under each sort of cultivation?

Doubtless, if it were judged desirable.

180. How early do you think such a return could be obtained?

I should think such a return might be obtained by the end of August, or the beginning of September; but I have invariably found, whatever the period may be at which the returns are to be made, that such period is sure to be considerably overpast. In the part of England with which I am officially connected, namely, Norfolk and Suffolk, we could not by possibility have any exact knowledge of the various root crops before June; therefore it was that the 1st of July was fixed; then the returns must all come in to be summaried after that date; these summaries might be issued, no doubt, before September, if it were absolutely necessary; but I do not myself perceive that there would be any materially important gain getting out the facts upon which the estimates are to be framed at an earlier period than the estimates themselves.

181. Am I rightly to understand your opinion to be, that you have no expectation of being able to obtain any accurate returns without compulsory powers, and that such compulsory powers would not be looked upon with any very great suspicion on the part of occupiers of land in this country, but would be considered by many as giving a sort of legal sanction for the system of returns which you are asking them to give?

I am now most decidedly of that opinion.

The Witness is directed to withdraw.

Ordered, That this Committee be adjourned to Thursday next, One o'clock.

Die Jovis, 21° Junii 1855.

LORDS PRESENT:

Earl DONCASTER.
Earl CARNARVON.
Earl STRADBROKE.
Earl BURLINGTON.
Lord BERNERS.
Lord LOVEL and HOLLAND.
Lord MONT EAGLE.
Lord COLCHESTER.
Lord STANLEY of Alderley.

LORD STANLEY OF ALDERLEY in the Chair.

Evidence on the best Mode of obtaining accurate Agricultural Statistics.

G. Pigott, Esq.

21st June 1855.

GRENVILLE PIGOTT, Esquire, one of the Poor Law Inspectors, is called in, and examined as follows:

182. *Chairman.*] YOU were engaged in the collection of agricultural statistics last year, were not you?
I was.

183. In what county?
In the county of Berks.

184. Were you so employed in the previous year?
I was not; that was the first year in which I had been so employed.

185. Will you have the goodness to state to the Committee the course which you pursued, and the difficulties which you experienced in obtaining the necessary information?
We were furnished with certain forms by the Poor Law Board, which I believe are before the Committee. We were required to communicate with the different Boards of Guardians, to ascertain whether the clerks of the unions would undertake the office of classifiers, and whether it was practicable to appoint the relieving officers as enumerators. As the subject was altogether new in Berkshire, it became necessary to meet each Board of Guardians, and the object not being thoroughly understood, nor the importance of it appreciated, I found considerable difficulty in getting the Boards of Guardians to consent to meet on any other than their usual day of meeting; that caused considerable delay; at that period of the year they meet fortnightly, and very often several meet on the same day; but at last I succeeded in obtaining meetings with various Boards of Guardians, and in every instance but three, statistical committees were formed, and the Board of Guardians undertook the collection of the statistics: in two cases the Boards, after hearing the usual arguments in favour of the measure, refused to undertake it, but, at my request, the clerks still undertook the office of classifiers, not as clerks to the Board of Guardians, but as gentlemen of influence and experience in the neighbourhood; and in the Windsor Union (which was the only union where the Board of Guardians declined altogether to interfere in the question), I was also enabled to obtain returns through the agency of the clerk; therefore, nominal returns were obtained from every union in the county. But I am sorry to say, from the very great unwillingness evinced in many instances, so many schedules were returned blank, or not returned at all, that I am afraid the total result can be of no imperial importance.

186. What were the motives chiefly assigned by those Boards of Guardians for declining to assist you in obtaining the information required?
In some instances, even where the Boards of Guardians undertook the collection of statistics in their unions, and thereby gave to the measure the whole

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weight of their example, and of the influence of the *ex officio* guardians, who are generally proprietors, it failed; they could not persuade the occupiers of farms in many instances to make returns. I might instance the district round Wantage, which is one of the best cultivated districts, and the most important, in an agricultural point of view, in central England; there the failure was greater than in any other part of the county of Berks, from the absolute unwillingness of the occupiers to lend themselves to the measure at all. It was my duty, of course, on every occasion, to enter very fully into the various advantages which must result to all classes from the measure, and especially to the farmers themselves, who would thus be placed, as sellers, on an equal footing with the great purchasers of corn; obtaining, without cost, the information which they require to estimate future prices. I adverted also to the great monetary advantages which would result to the nation, in which they would directly share, by being enabled to get accommodation at an easier rate from the country bankers. Obvious arguments of this kind were not answered at all; but there seemed to be a jealousy, a fear, probably, as has been stated by many persons, that the return might be used, either by their landlords or by the Government, to their prejudice; certainly there was a *vis inertiæ*, which defeated the most strenuous efforts on my part, and, I believe, on that of my colleagues.

187. Did you obtain much assistance from the proprietors of land in the country?

Generally, I did.

188. Did they try to explain to the farmers the object of the inquiry?

Yes; I found a very general appreciation of the importance of the measure on their part. At the same time I must say that, in my own district, a very strong impression prevailed, that it was hardly fair to call upon them, in their capacity of guardians, to go into this measure. So strong was that feeling, that in the Newbury Union, where there was a large proportion of *ex officio* guardians, they stated most distinctly (one gentleman particularly), that, although he was prepared to assist in the late collection as an experiment, and was convinced that agricultural statistics were of very great importance, he did not think Boards of Guardians were the medium through which they could be advantageously obtained.

189. Earl *Stradbroke.*] Was that the opinion of the chairmen of Boards of Guardians also?

I think I may say it was; as I stated before, this was the only occasion on which I have been employed, and my sphere of action was a limited one.

190. *Chairman.*] You state in your report that, in your opinion, the agency of Boards of Guardians is not the best agency which could be used for the purpose of obtaining this information; what other agency would you be inclined to recommend as a substitute for that?

I ventured to add, for the information of the Poor Law Board, in my report to them, that I had a very strong impression, almost amounting to a conviction, that the most effective and inexpensive mode of obtaining those returns accurately, would be to employ the clerks of unions, not as clerks of unions, but as being almost invariably intelligent gentlemen, solicitors of large practice residing in the centre of small districts, and usually well acquainted with the occupiers of land within those districts. Though the remuneration to the clerk of a union is small, as compared with the duties, we find the leading solicitors always desirous to get the office, from the business it brings to them. Every principal farmer in his turn becomes a guardian, and the connexion thus obtained becomes very considerable. I am confirmed in my impression by this circumstance: in the instances where the guardians refused to form a statistical committee, I was enabled to obtain returns through those gentlemen, and in some instances, more effectually than where statistical committees had been formed.

191. Earl *Stradbroke.*] Were not the Abingdon and the Cookham Unions exceptions to the general rule you have laid down?

They took up the matter at once. The return from Cookham was complete; but at Abingdon, notwithstanding that the Board of Guardians unanimously adopted

adopted the principle, and were very desirous to have it carried out, yet the occupiers resisted it.

192. *Chairman.*] The Committee understand that, although you do not think that Boards of Guardians are the best means by which this information should be obtained, you still think that the clerks of unions are the best parties to obtain the information. By what machinery would you propose to put them in motion; would you propose that they should be selected by the Poor Law Inspectors, or by what other mode?

I think that clerks of unions would be willing, for a very moderate remuneration, such as would repay them for the professional time they must necessarily devote to the subject, to undertake the task. They have already a great many duties to perform distinct from the purposes for which they were originally elected. They have many returns to make to your Lordships' House and the House of Commons, and they are public servants to a very considerable extent, apart from their duties in the administration of relief to the poor. There are certain statistical returns which it is found now more convenient to obtain through them than through any other channel.

193. Would you propose that they should receive their instructions from, and make their communications to some special officer directed to procure agricultural statistics?

I think so; I merely mention them as individuals of great intelligence, acquainted with every circumstance connected with land, and exercising often great influence over occupiers who might otherwise be refractory. A long-established firm of solicitors generally hands down its business from generation to generation, and I am of opinion, that for a very moderate remuneration, they would not be unwilling to add this business to the various other duties they now perform.

194. Do you think that the connexion of the clerks of the unions with the Poor Law Commissioners would be detrimental to the obtaining of statistical information?

Not their connexion with the Poor Law Commissioners. The Poor Law Commissioners, of course, are desirous to promote every object tending to the public advantage. I think, as regards the special duty of the inspectors, if the measure were made compulsory, and every person were obliged to make certain required returns, a Poor Law Inspector might possibly undertake the task. I am quite sure he could not now, consistently with the proper performance of his present duties, do so. In my own case—there are seven counties in my district—I had to collect agricultural statistics in one only, and the collection of them in that one prevented the proper performance of my other duties. If the duty were to be devolved upon the inspector of seeking each successive year to persuade a new Board of Guardians to adopt that which they were predetermined not to adopt, it would greatly interfere with the performance of the duties which belong especially to his office.

195. Earl *Stradbroke.*] Do you think the clerks of unions could obtain anything approaching to correct statistical information, unless there were great willingness on the part of the Boards of Guardians, and of the general body of occupiers to give it?

I think their powers of persuasion would be greater than those of any other persons, from the causes to which I have adverted; but I think if the legislature, or the Government, intend to have correct agricultural statistics, there must be a compulsory enactment. I have no doubt that, with increasing intelligence, the more the subject is ventilated, the advantages which all classes, and especially the farmers, must derive from it, will become more and more apparent; and in the course of time, possibly, the object may be attained voluntarily. And I might cite, as a presumption of that, that the only case out of the 13 or 14 counties in which the collection has been made experimentally, in which the success has been complete, has been the West Riding of Yorkshire. There is there, probably, more intelligence, and more wealth, and the farmers are more alive to their own interests.

196. *Chairman.*] Under present circumstances, it is decidedly your opinion

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that it is hopeless to obtain accurate agricultural statistics, without compulsory power for that purpose?

That is my opinion, in my district.

197. Earl *Carnarvon.*] Did these returns you have spoken of comprise an estimate of the produce?

No; only the number of acres under tillage, and the various crops.

198. Do you think that clerks of unions, if you required estimates of produce, would find sufficient time to make returns which would be satisfactory?

That would depend upon the amount of their remuneration. The more labour you entailed upon them the more necessary it would be to increase their scale of remuneration. I should question very much indeed the advantage of getting an estimate of the produce. I think it would lead to very fallacious returns. I do not think it would lead you nearer to your object of ascertaining the real amount of the produce of the land. I think that may be much more nearly obtained, by ascertaining, at a certain period of the year, say in the month of July, the amount of acreage under particular tillages, and the amount of stock of different kinds. These persons, accustomed to make such calculations, would, according as the harvest was a good one or a bad one, arrive more nearly at the real result, than by any estimate after the harvest, which it might be the interest of a great many persons to falsify.

199. What extent of crop can a practised valuer estimate the value of in a day?

There are certain persons connected with the corn trade, whose business it is, and who go to great expense every year to endeavour to get at what is likely to be the average produce. I referred to calculations of that kind.

200. Earl *Stradbroke.*] The opinion you have expressed with reference to the probability of obtaining correct returns through Boards of Guardians, is derived, is it not, from an experience of only one year?

Of only one year, and in only one county.

201. Do not you think, from what you know of your own district, that in a second year, there would be much less objection to furnish such information than there was in the first?

I almost fear the contrary. I think one of my colleagues, who may have to give evidence to-day, will state that in two counties the contrary proved to be the case.

202. Lord *Mont Eagle.*] You say that persons are employed by the principal corn-dealers, to make estimates of the quantity of produce throughout the country?

I believe so.

203. If their estimates are sufficiently accurate to make it worth the while of merchants and dealers to adopt that course, why could not they be made sufficiently accurate for the purpose of a Government inquiry?

I imagine the Government would require a greater amount of accuracy than the merchants do.

204. Lord *Colchester.*] I observe, in your return, you have included not only the number of acres under cultivation, but also the quantity of stock of different kinds; do you think there is more objection on the part of farmers to making a return of stock than a return of land under cultivation?

I think not; I assume it will be the object of the Legislature in collecting statistics, to ascertain what the amount of food, animal and cereal, will be from year to year. I do not think that those who would have to make the return would more object to that part of it than to the other. The amount of stock returned as upon a given farm upon a given day, does not represent the amount of stock which a farmer upon an average may have upon his farm. A farmer may have a large number of sheep at one period of the year, and not a single sheep upon his farm at another. The objection was made by many occupiers in the first instance, but that single answer satisfied them all; viz., that although the return, if correctly given, would inform the Government what quantity of stock there was in the kingdom, which was all they wanted to know,

know, it would not point out to them what was the average quantity which was kept by each particular occupier.

205. You found that that information did disarm their jealousy, did you?
Almost invariably.

206. Lord *Berners.*] Do you think, inasmuch as the parish officers have in the poor-rate books the acreage of every occupier in a parish, that would be found a useful agency for the purpose of collecting agricultural statistics?
Of course the rate-books are essential to correct information, and the exact information could not be obtained without reference to those rate-books with the precision or promptness which would be desirable. In every case our instructions to the enumerators were to go to the overseers to get the rate-book. The statistical committee was thwarted in one case by an overseer declining to produce his rate-book, and I had no power to compel its production. The Poor Law Inspectors have, in certain cases, the power to compel the production of all parochial documents, but in this instance there was not that power.

207. Lord *Mont Eagle.*] Did you apply to the Board of Guardians in that case?
I communicated with the clerk, but no one had the power to compel the production of the rate-book; the contumacy, therefore, of the overseer was quite successful in defeating the object in view.

208. *Chairman.*] Did you find that the amount of remuneration which was given to the enumerators was considered adequate, or was there any complaint made of its deficiency?
There was considerable complaint on that subject; I am quite satisfied it was wholly inadequate, and that the inadequacy of the remuneration tended very much to increase the imperfection of the returns; I may make that plain, I think, in one moment: where the occupiers refuse to make the returns, you are obliged to obtain them by the estimates of the enumerators. Very often the occupier will be unwilling to give any information, and if the enumerator should come upon his farm, he can warn him off if he pleases. In order to overcome that unwillingness or opposition, very often frequent journeys on the part of the enumerators are necessary, and of course if a man who is obliged to earn his livelihood only gets paid enough to remunerate him for one journey, he will not make five, or six, or seven. I think where a great imperial object of that kind is sought for, the remuneration should be on a somewhat larger scale.

209. What is the amount of remuneration which is at present given?
It was 40 *s.* to every enumerator for every 100 completed schedules, and 42 *s.* to the clerk for Schedule C.

210. Do you think those amounts, in both instances, are inadequate for the labour which was performed?
In both instances. The clerk received two guineas for the schedule, which was a most elaborate return, and 10 *s.* for every completed 100 schedules.

211. Was that in addition to the 42 *s.*?
Yes, but it amounted to very little. The whole remuneration, in two or three instances, in my own experience, was not above 3 *l.* or 4 *l.* to the clerk. As every respectable solicitor expects three guineas a day for his work, and three or four days work at least was necessary, it is obvious this sum was not a sufficient remuneration.

212. Do not you think the incidental advantage which you have stated clerks of unions obtain by being employed for such a purpose, would induce them to perform the duty at that low rate of remuneration?
No; I think those gentlemen obtain those advantages from the fact of their being clerks to Boards of Guardians. This particular employment rather brings them into antagonism with the occupiers.

213. Do you consider the amount of remuneration to the classifiers also inadequate?
I do.

214. What is the amount of it?
The classifiers receive 10 *s.* for every hundred completed schedules of Schedules

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A. and B., and two guineas for Schedule C. From the whole of those schedule the inspectors form a still more condensed return, which is transmitted to the Board of Trade.

215. Lord *Berners.*] It has been stated that employing the agency of Boards of Guardians for this purpose rather tends to awaken feelings of jealousy and distrust; is that your experience?

It has been so. I have found it to be so distinctly; there has been a jealousy of official interference. With regard to the question whether such employment interferes with the duties of a Poor Law Inspector, my opinion is that it does. Generally speaking, Boards of Guardians look to the inspectors as advisers upon the particular duties for which they are elected, and to which they understand they are to devote their time; but where inspectors come to persuade them to something of a wholly different nature that they do not like, they will be apt to look at them in the light of hired advocates, rather than as advisers.

216. Earl *Stradbroke.*] At the annual election of the guardians, is there generally a great change in the constitution of the Boards?

That depends upon circumstances very much. I have very little doubt that in the county of Berks, in reference to this particular subject, there will be a change at the next election of guardians, and that in some unions persons will be elected pledged to oppose this measure.

217. Do you think it would be difficult in each parish or union in Berkshire to find some competent person of experience and character who would be able to collect a fair return from the occupiers of his own parish?

I have no doubt that in every parish in Berkshire you would find intelligent occupiers quite convinced of the advantages of accurate agricultural statistics, and desirous that the measure should be carried out; but I very much doubt whether you would find persons who would undertake the task.

218. In what way do you think the clerk of a union would be a better person and more competent to obtain a correct return than such a person as I have just alluded to?

In the first place I would appeal to practical results in my own experience. In three instances, where the Boards of Guardians in my district refused to undertake the matter, the clerks did so, and, comparatively speaking, successfully. Then again, the clerks of Boards of Guardians are generally very intelligent persons, and well convinced of the advantage of the measure to all those who are interested in land; and they have the ear, generally speaking, of the occupiers of the district. The occupiers have confidence in them, and are ready to listen to their arguments; and I consider the arguments, if fairly listened to, are perfectly irresistible, and easy of comprehension.

219. Lord *Berners.*] It was stated to the Committee the other day that the relieving officers in unions have been brought into collision with the farmers, from being employed in that capacity; have you found that to be the case in your district?

I found a strong objection on the part of some occupiers and Boards of Guardians to the employment of the relieving officers as enumerators. I think the objection was based upon this ground, that the relieving officers are a class, generally speaking, totally distinct from the farmers. They do not choose that persons constantly resident among them should have an opportunity of saying so and so has got such a cultivation, or such and such stock, and of commenting on the various details of his management. The relieving officers, though very respectable persons in their own sphere, are not persons to whom occupiers generally would wish to convey their secrets as to their particular mode of tillage, so as to enable them to communicate them, either to their advantage or disadvantage, as the case might be. I am only giving my impression; but the fact is unquestionable, that there was a decided objection on the part of many Boards of Guardians to employ relieving officers. In other cases there was not that objection.

220. It has been suggested, that if a farmer in a parish, well known and approved of by his neighbours, were selected to form a committee in that parish, that committee might take the rate-book, which, as you are aware, contains certain

certain numbers applicable to the names of the occupiers; that having obtained the most perfect and accurate account of the quantity of stock, and so on, of each occupier in the parish, they should, in making the return, tear off the names, and simply forward the numbers, thus giving a return of the total cultivation of the parish; do you think some such scheme as that would obviate the objections which have been made?

If committees of that kind could be obtained it might be desirable, but in a statistical return for the whole empire you want certainty; you want absolute certainty every year that you can collect those returns with accuracy. In many instances I was obliged to make a concession to the statistical committee, which I did without prejudice to the information I obtained, that Schedules A. and B. should not come to me. The Board of Guardians would be the best possible committee of farmers, if they would undertake the task of collection. If the process were compulsory perhaps they might do so; and if so, it could not be better done than through their agency.

221. Earl *Stradbroke.*] Does the unwillingness of the relieving officers to undertake the duty of enumerators exist in all unions, or only in unions where the occupiers generally are adverse to the plan?

I do not think I found any great objection on the part of relieving officers to undertake the duty; I found an objection on the part of the guardians to employ them.

222. Not in all cases?

No.

223. Only in those instances where there was a disinclination to adopt the plan?

I am not prepared to say that. Where there was an inclination to adopt the plan, there might still have been a disinclination to employ the relieving officer to carry it out; I may cite the Hungerford Union as an instance of that.

The Witness is directed to withdraw.

WILLIAM HENRY TOOVEY HAWLEY, Esquire, one of the Poor Law Inspectors, is called in, and examined as follows:

224. *Chairman.*] YOU were engaged in the collection of agricultural statistics in the year 1853, as well as in the year 1854?

I was.

225. Both years in the same counties?

In the first year the inquiry was directed to Hampshire only; last year it was extended to the county of Wilts also.

226. It appears in your report, that the return with regard to Hampshire has been less successful and satisfactory this year than it was in the year 1853; will you state to the Committee the reasons which, in your mind, have produced that result?

I found a considerable disinclination on the part of the occupiers of property in the former year to give the returns, but the last year that disinclination has increased considerably. The objections have proceeded from several causes: one I think is, that there is still a little lingering political feeling on the part of some owners of property, as well as of occupiers, though it extends only to a small number. The Boards of Guardians think that the machinery of Boards of Guardians is not well fitted to the purpose of getting this statistical information. There have been other causes, which I cannot call to my recollection at present. Among the occupiers themselves, the disinclination has chiefly arisen, I think, from an idea that the inquiry is inquisitorial, and from their not wishing to have their affairs looked into, as they conceive that they have been through the means of this inquiry.

227. Earl *Stradbroke.*] Do you allude to both the counties you have mentioned?

Yes; I confine my observations to the inquiry of the present year.

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228. *Chairman.*] You state in your report that one great motive which you found operate to prevent the making of returns was an allegation that partial returns were useless; that the operation of the measure ought to be general, and that they would be ready and willing to make the required returns when a statutory enactment should make it imperative upon all to do so; is it your opinion that that feeling has prevailed to a considerable extent?

I found it prevail to a very considerable extent; I think with persons who understood the motives of the inquiry that was the principal objection.

229. Is it your opinion that if compulsory powers were given, they would not be unpopular, but on the whole would be well received by the occupiers of land in the county of Hants?

I think so; there may be a few who would object to them, but I think, by the general body of the occupiers, a compulsory enactment would be well received.

230. Is it your opinion that it is useless to attempt to procure useful agricultural statistics without such a power?

I am of opinion that it is quite impossible to collect them without it; manifestly the objection to furnish returns is growing.

231. Is it your opinion that the remuneration given to the enumerators and classifiers is adequate to the duties they have to perform?

I think I trace a good deal of the difficulty we have met with in the collection of statistics to the inadequate remuneration given to the officers, the classifiers and enumerators; in many cases they express great dissatisfaction at the amount of remuneration which has been given to them.

232. Is it your opinion that the best machinery for obtaining the desired information is through the means of Boards of Guardians, or do you think that any other machinery might be more advantageously used for the purpose?

I am fully of opinion that Boards of Guardians are by far the most proper machinery for carrying out any future inquiry which the Government may think it necessary to institute; my reasons for that opinion are, that the Boards of Guardians are composed generally, particularly in rural unions, of persons who are thoroughly acquainted with agricultural matters, who know all the ratepayers in the different parishes, and who will in most instances assist, and get their neighbours to assist in supplying the necessary information.

233. Do you think if the course were pursued which was recommended by the preceding witness, of employing only clerks of unions, without seeking the assistance of the guardians, that mode would be an equally advantageous course?

I should look upon the clerk then not as an officer, but only as an individual employed, and taking him in that capacity, I think he would be almost powerless; as clerk to the Board of Guardians, acting in concurrence with the Board, and having other officers under him, I think he would be fully competent to undertake the duty, and that he would be the most proper person to undertake it.

234. Do you think, without the assistance of the guardians, he would want the authority and influence which would enable him to obtain the necessary information?

Yes.

235. Earl *Carnarvon.*] Any scheme which depended upon the voluntary co-operation of the farmers themselves, you think would be likely to be unattended with success?

I have no doubt any experiment carried out upon the voluntary principle would be a complete failure; I apprehend the result would be less satisfactory in future than it has been on the last occasion.

236. *Chairman.*] Do you think there has been in any instance an ill feeling created on the part of the ratepayers against the guardians, from the fact of their being employed to obtain those agricultural statistics?

I am not prepared to say that there has been.

237. Do you think that the performance of this duty is in any way connected with

with the duties which Poor Law Inspectors, or the Poor Law Guardians have to discharge?

As far as regards the inspectors, I think the duty greatly interfered, on this occasion, as well as on the former one, with the functions I had to perform as a Poor Law Inspector; the difficulties I experienced arose principally from the great amount of correspondence which I had to carry on with the different Boards of Guardians, and with individuals from whom I was constantly receiving letters, requiring information upon different points; the greater part of my time was taken up in correspondence, which interfered very materially with my duties. I traced that to the working of the voluntary principle; I think, if it were compulsory there would be very little difficulty in carrying out the inquiry.

238. Having stated before, that you consider the amount of remuneration given to the enumerators and classifiers inadequate, do you think, if compulsory powers were given, the labours of those officers would be much diminished, and that in that event their present amount of remuneration would be sufficient?

I doubt whether, even then, it would be sufficient; I should, even then, recommend a more liberal remuneration, though their duties would decidedly be considerably lessened. On the last occasion they had to call upon different occupiers repeatedly to get the return filled up; and in many cases they have had to make it up themselves.

239. Do you think that proceeded from some little want of intelligence on the part of the occupiers, and their not knowing how to fill the returns up?

In the case of some of the smaller occupiers that might have been the case.

240. As the plan proceeded, would not that difficulty be lessened very much?

I think it would.

241. Lord *Colchester.*] Do you think the Boards of Guardians would, generally speaking, voluntarily undertake the duty?

I should think they would; there were a few instances in which they refused.

242. You would not think it necessary to make it compulsory upon Boards of Guardians to act?

Yes, I think I should.

243. If you were to make it compulsory upon Boards of Guardians to act, supposing they were disinclined to do so, you could hardly hope to get persons to be elected guardians, could you?

In that case I should not know what machinery to fall back on.

244. If you made it compulsory upon the Boards to act in the way of carrying out this scheme, would not there be some difficulty in finding persons to act as guardians?

There might be that difficulty.

245. Earl *Stradbroke.*] How would the plan act of leaving it optional with Boards of Guardians, whether they would undertake the duty or not, giving them, however, compulsory powers, in cases of necessity, over refractory occupiers?

The objection which I stated just now, still applies; it is difficult to say what machinery could be resorted to to carry out the inquiry, if the Boards of Guardians refused to act.

246. *Chairman.*] What course did you take in the cases of those unions which refused to co-operate with you?

In the last inquiry I took no steps at all; I did not bring them into the statement. On the previous inquiry, when the Board of Guardians at Winchester was the only one which refused to co-operate, I appointed officers of my own, to carry out the inquiry through their means; that caused me a considerable amount of trouble, and was a very unpleasant business; I had to get information in ways I did not approve of myself.

247. In other years were they omitted altogether from your returns?

Yes; one reason for that was, that the money granted by the Government

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for the purpose was not sufficient to enable me to carry out the inquiry in those unions where they refused co-operation.

248. Would the refusal of those unions account for the great discrepancy in the returns between 1853 and 1854; in 1853, the total number scheduled being 8,594, whereas in last year it was 6,794?

It would account for that; and it would also account for the decrease in the return of cultivated acreage in the last year.

249. Earl *Burlington.*] Do you think the relieving officers the fittest persons to be employed as enumerators?

I think they are; I should consider them as being the best persons we could employ, as they know all the occupiers of the land, and are known also to the occupiers.

250. You found no objections urged, arising from the employment of the relieving officers as enumerators?

No, I think not. In the Isle of Wight, on the previous inquiry, I remember there was a good deal of dissatisfaction as to the relieving officers being employed, which went so far that some of the occupiers threatened these officers.

251. *Chairman.*] Notwithstanding the difficulty you found in obtaining the information in many unions, did you, on the whole, find, on the part of the more intelligent agriculturists in Hampshire, there was a just sense of the value which agricultural statistics possessed to them in the prosecution of their own interests?

Certainly; I found, throughout, that the leading agriculturists were quite ready to give the returns. Those who objected were chiefly among the lower class of occupiers.

252. Lord *Berners.*] I see a letter in the report, from Mr. Taylor, Chairman of the Agricultural Statistics Committee at Alresford, in which he says, "If a legislative enactment could be introduced connecting a more accurate taking of the corn averages with that of the statistical returns, the law would be promptly complied with, and little or no difficulty experienced in carrying such a measure out;" did that allude to a return to be made by the sellers as well as the buyers?

I am not aware.

253. What "more accurate return of the corn averages" did he allude to?

The whole system of corn averages is deficient, in my opinion, speaking from the little I know of it; in fact, it is quite illusory, I think; I believe not half the corn which is sold at market is brought into the account. There is very little inferior corn sold; and if there is any, it is always excluded from the returns.

254. Earl *Stradbroke.*] Is not some corn returned twice occasionally?

There are many instances of that.

255. Lord *Berners.*] Supposing that you once obtain a return from each district to the effect that the average produce of corn in one district is three quarters per acre, and in another four, and so on, would it not be easy in future to get a return simply in such a form as this,—"full crop," or "average," or "short," instead of again going into details as to the amount so much per acre, which you would ascertain in the first instance?

I should prefer the details, setting out the amount per acre in each case.

256. Would there not be difficulty in getting such a return?

I do not think there would.

257. *Chairman.*] Is it your opinion, that for the purpose of obtaining agricultural statistics, the Poor Law Commissioners, Boards of Guardians, and union officers, are the best machinery you could employ?

Yes; I have always maintained that opinion, and I have seen no reason to change it.

258. Is there any alteration which you would suggest for the purpose of making that machinery more efficient?

None,

None, but making the returns compulsory; I think the machinery, as far as it is now established, is as perfect as it can be. It is right, I think, to state to the Committee that this year, in the inquiry in Hampshire and Wiltshire, we were directed to obtain a statement of the produce of the corn, and I am sorry to say that the inquiry into the amount of the produce was a greater failure even than that as to the amount of acreage. There were very few unions from which I could get any returns of the amount of produce. I see no difficulty, however, in it at all. I think if the clerks of the guardians obtained information from two or three practical farmers in each parish, and the results of those inquiries were brought to the Board of Guardians, they would be in a position to estimate what would be the fair average amount of corn in the union.

259. What is the earliest period at which you think you could make the return, not of the produce, but of quantity of land under different species of culture?

I think the return, as to land under culture, should not be delayed longer than July; and I think, at farthest, the returns of produce should not be later than August.

260. Could the whole of the returns of produce be sent in by the month of August?

Generally speaking, the amount of produce cannot be ascertained till the thrashing takes place; still, I think an estimate may be formed of the harvest in September at all events, if not in August.

261. Would you propose to form that estimate on the growing crops?

I think a great deal of it would then be cut, and the farmers would then have an opportunity of ascertaining pretty nearly what the produce would be.

262. Lord *Mont Eagle.*] At what time were the returns made last year?

They were not sent in till December.

263. The account of the quantity of corn grown, which you represent as being fallacious, was not founded on estimate, was it?

It was founded on the estimate obtained by the guardians from the occupiers in different parishes, after the harvest had been gathered in.

264. Earl *Stradbroke.*] In some instances those estimates are very fallacious, are not they?

I should think they would be fallacious, but not so fallacious as the estimates made by the corn-factors. They send a number of their agents down into the country just before the harvest is ripe, who take a few yards in extent in different districts, and measure it, making their estimate according to the appearance of the portion of the crop so measured.

265. The earlier in the summer it is attempted to be made the more difficult it is to arrive at a correct conclusion?

Certainly.

266. Earl *Carnarvon.*] To procure a correct estimate of the produce, of course, must be the work of a considerable period?

It must; it could be only done parochially. Some parts of the parish might be light land, and others of a heavier description; and there should be returns made from both descriptions of land, and the guardians would draw their average from that information.

The Witness is directed to withdraw.

JAMES CAIRD, Esquire, is called in, and examined as follows:

267. *Chairman.*] HAVE you given your attention much to the subject of agricultural statistics, and the best mode of obtaining them?

Yes; I have been very extensively engaged as the "Times" Commissioner, in going over England, for the purpose of getting agricultural statistics; not of the crops alone, but of the state of property and cultivation altogether. In that inquiry,

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inquiry, of course I had an opportunity of directing my attention to this subject.

268. You are aware of the mode which has been pursued in England by the Poor Law Commissioners, through the agency of their officers, in attempting to obtain information during the past year?

I am so, in so far as their report gives me that information.

269. Is it your opinion, that that is the best means of obtaining such information, or can you suggest to the Committee any other mode which in your opinion would be better calculated to obtain the desired results?

I do not think it the best mode of obtaining that information; I myself suggested to Mr. Cardwell, about two years ago, a mode which I subsequently read before the Society of Arts, and which, if your Lordships will permit me, I will again go through. The main object is to obtain trustworthy returns, and those with the least necessary expense. Trustworthy returns can only be obtained through trustworthy officers, responsible for the correct performance of their duty, and working under a system which affords a ready test of accuracy. Economy will be promoted by employing a small number of competent and responsible men, rather than a very numerous body of local officials, each of whom must receive a fee, while they would be comparatively irresponsible, and, from their numbers, subject to no satisfactory test of accuracy. I think I am supported in that opinion by the opinions which have been given by the gentlemen employed last year. In the first place, Sir John Walsham says, at page 35, he "believes that in England special and duly qualified agents will have at the first to be generally appointed" for ascertaining the estimates of the produce. At page 36, Sir John Walsham also states, that the test of his returns was obtained from the Blything Union, not exactly through the means of the Board of Guardians, but by the appointment of confidential enumerators, "these parochial and confidential enumerators having obtained personally from the occupiers all the information required." That is the mode which I recommend, and the propriety of which he confirms. At page 57, Mr. Pigott says, "It ought not to be mixed up with the duties of the Boards of Guardians," and he repeats that at page 58. As the returns, to be useful, must be made within a very short time after harvest, and before much of the crop can be thrashed, they must necessarily be of the nature of an estimate in so far as the yield per acre is concerned. It is desirable, for many reasons, that the collection of the returns be made in a manner as little inquisitorial and offensive as possible. If either, they will be apt to fail in their main object, correctness. The employment of confidential officers, bound to secrecy, will be a guarantee against the use of the returns for any but public purposes. I find that opinion confirmed in many places in this Report: at page 12, Mr. Hawley says, "I undertook the task of conducting the proceedings there, by officers of my own appointment, with whose assistance I succeeded in obtaining very complete returns." At page 78, I find this to be stated: "Individual schedules should be safe from exhibition to other parties under a penalty to be imposed." From what I have heard in the examination to-day, and from my own inquiries, it appears that it has been considered very objectionable on the part of the farmers, that their returns should be subject to anything like local inspection and criticism. The first point to be ascertained is the acreage under each different crop, and this is by far the most important part of the inquiry. This will not be an estimate, but a record of facts. It is requisite, therefore, that it be conducted with care and deliberation, and, as it may be begun as soon as the seed is sown, the three months of May, June, and July, may be occupied in this part of the inquiry. There could be no reasonable objection on the part of any occupier to an inquiry as to the manner in which the surface of his farm is cropped. That is quite a different question from demanding to know the total produce of his crops. It may be proper, therefore, to make answers to this inquiry compulsory, if necessary, which necessity, it is believed, would very rarely arise; nor would there be the same objection on the part of the farmers to answer such questions when put by a responsible and confidential officer, as by what might be thought a prying and irresponsible neighbour. I think it due to myself to say, that two years ago, I said to Mr. Cardwell that I apprehended the failure of any attempt to collect agricultural statistics without a compulsory power; I then anticipated and mentioned objections which have since arisen,

arisen, and which have been stated by the gentlemen who have been examined to-day.

270. Do you still entertain the opinion that it would be useless to attempt to obtain agricultural statistics without compulsory power?

I do, fully. The varying measures and weights in use throughout the country are a further argument in favour of competently qualified officers who could personally ascertain the local measures, and convert them into the recognised standard; and this might be made the direct means of introducing and gradually establishing a uniform standard of weights and measures throughout the kingdom. It is clear, unless some one is there to see that the returns are not made in the local measure, they may be very erroneous.

271. Earl *Stradbroke.*] Would they be erroneous if returned to the Boards of Guardians who live in their locality?

Not if the Board had any means of ascertaining that the specific returns were made in the local measures; if they knew that the whole of the returns were made in the local measures, they might convert them; but half of them might be made in the local measure and half in the imperial measure.

272. Do you think that probable?

It is possible, certainly, and I think it is very probable.

273. Earl *Doncaster.*] You must be aware that in Scotland the greatest difficulty prevails in obtaining accurate information, inasmuch as one man will compute in the local measure and another in the imperial measure?

I am quite aware of that. The acreage under each different crop having been ascertained, the occupier would be required to say not what was the actual produce of a particular field, but what was the average produce per acre of each crop on his farm in ordinary years. Before harvest these important facts would thus have been ascertained, viz., first, the extent under each kind of crop; secondly, the average produce per acre of ordinary years.

274. *Chairman.*] How would you arrive at the average produce before the period of harvest?

I speak of the average produce of previous years, not of one particular year.

275. Earl *Stradbroke.*] Admitting that great improvement is going on in the agriculture of the country, is not it reasonable to suppose that the present and future averages will be much higher than those of a few years back?

Yes; but in putting such a case I apprehend the farmer would refer to an average of four or five years back; he would not go a great number of years back. There would remain to be ascertained after harvest only how much the yield of that crop was above or below the average. The effects of good or bad cultivation on each farm having been ascertained by the average produce, it follows that the effects produced by good or bad weather would be all that would remain to be learned after harvest; and as the effects of weather over a parish would be pretty uniform, a single answer from a competent judge of light and heavy soils in each parish would fix this point. An alteration in the average quantity to the requisite extent could be made with great facility. The much greater importance of ascertaining accurately the number of acres under each crop than the yield per acre, is shown by the statistical returns of Ireland, which tells us that in 1849 there were 687,646 acres of wheat, yielding 2,148,893 quarters. In 1852 there were only 353,566 acres of wheat, yielding 1,154,205 quarters. The decrease in acres between those two years was 334,180 acres, or 994,638 quarters. But if the variation above or below average produce had been alone taken, without inquiry at the same time as to the proportion of acres under wheat, the returns would have been entirely fallacious; the yield per acre in 1852 having averaged 26 bushels against 25 in 1849. Thus, taking the acreage of 1849 as 687,646, and applying it to the average yield of 1852, the returns would be 2,234,849, which would be an error of no less than 1,080,644 quarters beyond the actual produce of 1852. The ascertainment of the area under each crop is thus clearly the most important part of the returns; and this branch, as already mentioned, may be conducted with care and deliberation, as it extends over a period, if necessary, of three months.

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276. Earl *Carnarvon.*] To make the return perfect, it would be necessary, not only to state the yield per acre of the produce, but also the average weight of the produce?

No doubt that would be necessary for an absolutely accurate return; but I apprehend that that is quite impossible.

277. If you omitted that, would it not lead to great variations and uncertainty?

It would undoubtedly involve some variations, but I think practically it might be embraced in the average which would be taken after harvest.

278. Earl *Stradbroke.*] Do not you think a return of the supposed weight of the year would give you a more accurate knowledge of the crop than the average of the farm for some years previously?

I do not think so; sometimes you may have a very large crop of wheat, and not a very great weight. The weight very much depends upon the brightness of the sun, and the state of the weather just at the period of ripening.

279. You are supposed by this plan to get an accurate return of the number of quarters grown. Applying that to the estimated weight of the corn, would not the result give you a more accurate return than one formed merely upon an average of years?

I think you must take an average of years, in order to form your comparative return of produce for the year as to which you are inquiring.

280. Would not that be readily arrived at as the years go on?

Of course; if you go on with this inquiry, in the course of five or six years, you would arrive almost at a certainty, in regard to past averages. At present you have not the means of doing so. It will be necessary that each collector of returns be provided with an accurate map of the district committed to him, and a correct list of the occupiers of land in each parish. The Tithe and Inclosure Commission Office is suggested, as it affords a machinery already organised, with competently qualified officers, locally employed in every part of Great Britain. This office is also possessed of the most complete system of maps of the various districts of the country which can at present be had. From these and the Ordnance Surveys, with local information, a very accurate map of each county and parish could be compiled. An accurate list of the occupiers of land would be obtained from the collector of rates in each parish. Taking the foregoing data as the principles on which to conduct the inquiry, the following would be the plan of operations,—(I do not say that this is the only plan, or anything like it, but it is one which I have considered).—I will suppose a branch of the Tithe and Inclosure Commission Office, or such other office as the Government may deem most suitable, to be the central office for issuing instructions, comptrolling officers, inspecting and testing the accuracy of the returns, and for arranging them for publication. One, two, and in some cases, three collectors of returns for each county, according to its extent, would be appointed. These would be selected as men of known competence; each collector would be employed, on an average, 90 days before harvest in ascertaining the acreage under each crop, and other particulars; and 10 days after harvest in ascertaining the comparative yield of the last crop. The collector, provided with his map and list of occupiers, would, between the 1st of May and the end of July, personally visit every occupier of land within his district, and mark down in a book the several particulars required to be ascertained. This book would, when completed after harvest, be forwarded to the central office in London, and would be preserved for the purpose of being afterwards tested by the personal inquiry of a superior officer. Immediately after harvest the collector would again visit each parish in his district, and satisfy himself as to whether the crop of each kind was an average, or how far it was above or below an average. Having already calculated the average produce of each crop in a parish, he would alter that to correspond with the actual produce of the particular season. Thus, for example, if he had ascertained that a certain parish had 1,500 acres in wheat, which at the rate of the average of years yielded 39,000 bushels, but that the actual yield of that year had proved two bushels an acre below the average, he would subtract 3,000 bushels from the above quantity, and return 36,000 bushels as the estimated yield of wheat in that parish. The main part of the calculations having

having been completed before harvest, the alterations necessary after harvest would be made with great facility, and the gross returns of the crops be ready for publication by the 10th of October. Monthly reports of the state of the growing crops at the most critical period would be made during the three months of inquiry. It would be part of the duty of the central office to test the returns of every collector, by an inspector taking his returns for a particular parish, and investigating on the spot each statement recorded. This should be done in spring, so that the estimate might be compared with the fact after the crop was thrashed out, and thus any carelessness or gross inaccuracy would be detected, and a useful guide be supplied for the future. Incompetency or carelessness would be visited with loss of employment. After the gross returns of produce were issued (which would be the first object), it would be the duty of the central office to compile from the returns such valuable statistics as had a special bearing on the agricultural improvement of the kingdom, and of every separate district in it. I have thought it proper to prepare a Table, showing the manner in which I think this plan would work, and an estimate of something like the probable cost.

The same is delivered in, and is as follows:

TABLE showing the Detail of Work in Collecting AGRICULTURAL STATISTICS for ENGLAND and WALES on Mr. CAIRD's Plan.

ENGLAND AND WALES.

Area in Acres.	Acres in Tillage.	Number of Farmers, per Census of 1841.	Acres of Tillage to each Farmer.	Number of Collectors of Statistics.	Number of Farmers to be Examined by each Collector.	Number of Days in which each Collector will be engaged at first Examination.	Number of Farmers to be Examined, per Day, by each Collector.	Number of Tillage Acres to be Examined by each Collector, per Day.	Total Tillage Acres in each Collector's Return.
37,324,915	12,441,776	226,403	53	200	1,132	90	12	636	62,000

Estimated Cost of collecting Returns by this Plan:

200 Collectors at 100 days each (90 days collecting Returns; 10 in ascertaining Averages) at £.1 per day, £.100 each - - - - - - - £. 20,000

281. *Chairman.*] The 20,000*l.*, which is your estimate of the expense, would only include the expenses of collecting the annual reports; what additional expenditure do you think would be required?

That would depend upon the mode pursued in London, and whether you could avail yourself of any existing machinery.

282. In your calculation you do not take into account anything more than the actual expenditure of the collectors themselves?

No; I compare it with the expenditure which has been gone to this year; and which I apprehend does not include anything for the staff in London. I find in the printed Report that there was to be a grant of 4,000*l.* for about one-fifth part of the whole of England; five times that would, of course, amount to 20,000*l.*

283. The only additional cost which in your opinion would be required, would be the cost, whatever that might be, of the staff in London, which would have to collect those returns together, and prepare them for publication?

That is my opinion; of course I give that only as a rough estimate.

284. Is it your opinion that a collector so appointed by a central department in London would as readily obtain from a farmer the information required, as it would be obtained by the intervention of Boards of Guardians who know the circumstances of the farmers?

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I think it would be more readily obtained through a confidential officer, by whomsoever appointed, whether in London or by the Board of Guardians. I think, generally speaking, men are more ready to communicate the particulars of their business in confidence to a sworn and confidential officer, than to persons who may canvass them at the Board of Guardians' table.

285. You do not think it would be desirable to give the appointment of those persons to the Boards of Guardians?

I see no objection to that, nor do I offer any opinion upon it.

286. Do not you think it would be easier to deceive a paid public officer than a person who resided in the neighbourhood?

I do not think so; a paid competent officer, who made this his entire study, would very soon become very expert at it.

287. In all cases the Committee understand you to propose that some person in the district or in the county should be selected?

I think that ought to be done.

288. Earl of *Stradbroke.*] Have not you found, in your experience, that a person living in the neighbourhood is generally a much better judge on such subjects than a person who comes from a distance?

I quite think so, and I mean that such a man should be selected for this purpose.

289. *Chairman.*] Is it your opinion that there is equal importance to be attached to obtaining a correct return of the amount of stock as there is to obtaining a correct return of the cereal produce?

I do not think so in reference to the food of the people, inasmuch as the live stock of the country is not affected by the seasons in the same way that the crop is liable to be. I do not think live stock subject to the same sudden variations as cereal crops are; I think it would be very desirable, but not so necessary.

290. Is not it your opinion that it would be desirable for all purposes to obtain such information?

Clearly; but I do not think it so necessary as the obtaining of information upon a question involving the food of the whole country. If even you could ascertain that there was a great falling off in the amount of stock, there is no means of supplying the deficiency; but if there is a great falling off in the crop, we generally possess such a means by obtaining supplies from abroad.

291. When once the machinery is established for obtaining the one class of information, would it be any great addition to the labour or to the expense to add the other information to it?

I think it would, in the first place; I would engraft the other upon the principal inquiry after a year or two; I think farmers are generally more reluctant to give information as to their stock than their crop. It is obvious to the eye how the surface of the ground is cropped, but people do not like to have their stock inquired into. I think, therefore, it would be wise to limit your inquiry at first to the cereal crop.

292. Earl *Doncaster.*] Do you in that answer allude to cases where there is a mixed system of farming?

I am alluding to the whole country.

293. Would you propose to include in your return the green crops?

I do not think it is essential that that should be done at first, except in the case of potatoes.

294. Have you examined and considered the returns which have been made of agricultural statistics during the last year, in Scotland?

I have.

295. Is it your opinion that those are an accurate representation of the produce of that country?

I think the inquiry was very well conducted, but I think there is not the least test of its being accurate.

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296. Is it your opinion that any other mode might have been devised which would have given us a more accurate return?

I think the mode which was adopted in Scotland of sending returns direct to the Secretary of the Highland Society, and having local committees to fix the averages, was an extremely good one in theory, but there was no opportunity of checking the correctness of the returns, which were sent direct to Edinburgh. It appears to me that there is a machinery in Scotland at the present moment, upon which this inquiry might be with advantage engrafted. I have here a copy of a schedule which has been issued under the Land Valuation Act of Scotland, which has just come into force, and under which the occupiers and proprietors are, under a penalty, bound to return the nature of the subject they occupy, the parish in which it is situated, the estimated extent; the grain rent, the kind of grain if a grain rent, the amount of conversion in converting it into money; the drainage interest, if any is paid by the tenant; and it would be easy to add three or four columns, embracing the returns with reference to each crop; this is required under an Act of Parliament; and there have been in every county in Scotland valuators appointed who would be very useful men for obtaining this information.

297. Who are the persons who issue that paper?

The county valuators.

298. By whom are those officers appointed?

They are appointed by the Commissioners of Supply in each county.

299. Would you propose that in addition to those columns which the occupiers are required to fill up, certain other columns should be provided, which would also show the amount of the produce on the different farms?

It seems to me that the two things might be very easily put together; it would be a very natural addition to make to it.

300. In using such returns you would rely entirely upon the return as made by the occupiers, would not you?

No; I understand that the valuator is obliged himself to go round and to certify the correctness of the returns.

301. Earl *Doncaster.*] Is he obliged to do that annually?

I am not aware; he has a permanent appointment, with a certain salary, and I presume he would be obliged to do it annually, if required.

302. *Chairman.*] Is it your opinion that this plan might be substituted for the mode which has been pursued during the last year, and that equally accurate information would be obtained by requiring the occupiers in all cases to furnish such additional information as might be necessary, with a view to those returns?

Yes; but I think it would be necessary to give some additional remuneration to the officer, inasmuch as he would have a considerable amount of additional duty to perform.

303. Do you think that plan might be carried out at less cost than the present?

I think it might.

304. Lord *Mont Eagle.*] You would adopt one form in Scotland and another in England?

Yes; I would take advantage of the existing machinery in Scotland, which does not exist in England.

305. Earl *Doncaster.*] You say that you think no reliance can be placed upon the accuracy of the returns obtained under the present system in Scotland; have you any particular reason for doubting the accuracy of the returns?

I have seen some reason to do so in my own district, and I think it is quite clear that there is no test of its accuracy whatever.

306. Were the inaccuracies to which you refer matters of moment, or only small matters of detail?

They might or might not have been small matters, as they could not be

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tested; but I apprehend you cannot place reliance upon the returns, from the want of a test.

307. *Chairman.*] The only test you would have, if the course you recommend were adopted, would be the vigilance of the valuator himself?

And the check of an officer who would be sent round for the purpose of testing in some particular instances the returns which were made.

308. Could not such an officer be equally readily employed to test the accuracy of the returns under the present system?

In Scotland I think it would be quite possible to test the returns of the valuator, but not those under the present system.

309. I understand you to say that at present there is no means of testing the accuracy of the returns obtained in Scotland, whereas by the course you propose there would be an easy test, applicable to all cases. You propose to send down a person to test the returns made by the occupiers; could not the same course be pursued under the mode now adopted, as well as under the one which you propose?

I think not; inasmuch as you have, at present, no local officer who is responsible for any inaccuracy in the returns. There is no one to be tested except the farmer: the returns all go direct from the farmer to Edinburgh.

JOHN HALL MAXWELL, Esquire, further examined as follows:

J. H. Maxwell, Esq.

310. *Chairman.*] YOU have heard the evidence of Mr. Caird: is it your opinion that the mode by which he proposes to obtain the information required is well calculated to carry that purpose into effect, and do you think it would be any improvement upon the course hitherto pursued in Scotland?

I have listened to the evidence of Mr. Caird, and, so far as I understand his scheme, I consider it quite inapplicable to Scotland. In many points I quite agree with Mr. Caird. I conceive that the Scotch scheme, in many respects, is based upon the points which Mr. Caird has laid down as indispensable, namely, that inquisition should be avoided, that secrecy should be observed, that the acreage should be obtained as a preliminary fact, and that the produce of the crops should be ascertained by estimate. I endeavoured, upon Tuesday last, to explain to the Committee how we had sought to provide for such points. Mr. Caird and I are therefore at one, so far, but beyond that I must say I cannot agree with him. I would, first of all, if permitted, take his latest suggestion, namely, that we should make use of the machinery under the new Act for assessing and valuing land in Scotland. Mr. Caird's proposal, as I understand it, is, that by the addition of a few columns, for the acreage of the different crops, to the schedule served upon the occupiers and the proprietors of land, we could, under the existing machinery, collect all the information we require. My first objection to that is, that it will at once land us in that, which, in Scotland, it has been our great object to avoid, namely, connecting the obtaining of agricultural statistics with the taxation of the country, whether local or general. Mr. Caird, I am happy to say, has acted with me as enumerator for his own district of Wigtonshire, and he was kind enough to take the chair at one of my public meetings last year. Mr. Caird will recollect how anxiously I attempted to impress on the farmers that by no means were the inquiries mixed up with taxation, nor could the answers, as published, be in any way connected with or brought to bear on taxation. Mr. Caird very ably seconded my statement at the time, and I am quite convinced of this, that any success which may have attended the Scotch inquiry, is very much to be attributed to the pains which were taken on all hands and on all occasions to disabuse the minds of the farmers, where a misapprehension existed, as to any possible connexion between agricultural statistics and taxation. Therefore, upon this ground alone, I do, with great deference, object to the machinery which Mr. Caird proposes to use. I know that, with men of Mr. Caird's own stamp, there is no such apprehension in regard to the objects of the inquiry, as some others sometimes have, and the absence of that apprehension may lead him to suppose that there would be no objection elsewhere; but, coming in contact, as I have done, with the farmers

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of the country at large, I know that it would be unwise to attach this inquiry to any machinery devised for taxation.

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311. With regard to the opinion which Mr. Caird has expressed, that there is a want of means of testing the accuracy of the returns as now made, can you suggest to the Commitee any mode by which an efficient test may be furnished, if you think none at present exists?

Mr. Caird, to a certain extent, is right; but, to a certain extent, he is wrong as to the want of any test of accuracy under the scheme which was devised and worked out by me. There is, to a certain extent, a test of accuracy; I described on Tuesday, how, incidentally, I had here and there a valuable test of accuracy, by the investigations of certain members of the committee who conceived it was their duty to collect the acreage of their parishes, and the identity between their reports and the aggregate of the individual returns from such parishes. It may be said that this was accidental, but if the result of the accident be valuable as a test, I could easily do the same thing here and there again. If it was one year done here, and another year there, and if the result was such as to satisfy Government of the *bonâ fides* of the farmer, and that their returns of acreage were substantially correct, it would, to a certain extent, serve as that test of accuracy which Mr. Caird thinks is wanting. There was another test of accuracy; in some instances the enumerator of a district required me, to enable him to estimate the crops, to send him, not what the acreage of this man was, or that man, for I would not have done that—those were confidential statements to me—but what the general acreage of the crops over a district or in a parish was. In such cases any glaring error necessarily attracted his attention, or that of the member of committee for that parish. Many trivial errors were discovered, which led to a great deal of correspondence on my part, with a view to trace and put them right; but the character of the errors was such as to satisfy the enumerators and myself, that there had been no intention to deceive. That was another check. Mr. Caird was asked by a noble Lord, whether his views as to the want of accuracy in the Scotch returns were based upon the fact of inaccuracy, or only upon an opinion that there might be inaccuracy. Mr. Caird stated, that in his own district there were some slight inaccuracies; of course they must have been very slight, because he being my enumerator in that district, they were not communicated to me, and I have not heard of them till the present moment. There is another test, which, as a farmer, Mr. Caird must admit exists; those schedules show the rotation of a farm, and every person who knows anything about farming, and gets accustomed to reading the schedules, will see at once where there is a material misstatement. If there should be 150 acres of barley in the return, and there are only 15 or 50, it will speak for itself, and lead to correspondence in order to trace the error; this was the case repeatedly last year. It may be asked, moreover, what is the object which a farmer has to deceive in making his return of acreage. In preparing an estimate, the parties may have an interest in falsifying the estimate, but I put great faith in the honesty of the farmers in Scotland; some of them may refuse to give information, but I have the most perfect confidence in their honesty and *bonâ fides* when they do give it; and as it was only the acreage which was asked from them, a fact any one could ascertain, and as the individual returns of acreage were not to be published, but only the acreage of a large district of parishes, if the farmer put as much confidence in my honesty as I did in his, he had no object in deliberately misstating his acreage, and I do not believe it was done. So much for the test of accuracy; but I will go a little further, and say, if there is no test of accuracy in the scheme which has been worked out in Scotland, I want to know where it is in that which Mr. Caird would substitute for it. I did not exactly gather whether Mr. Caird meant to apply the machinery to Scotland, that he spoke of in the first part of his evidence as to England, for, there, there is no test of accuracy. If the general scheme which he proposed for England, particularly in reference to the estimates of produce, were to be proposed for Scotland, I would object to it on the ground, *inter alia*, that there is no test of accuracy. It appears to me to be a fallacious scheme: he starts on an assumed basis which does not exist, and that contains no test of accuracy whatever. The basis of Mr. Caird's scheme for estimating produce is the average yield of ordinary years for each farm: I am perfectly confident of this, whatever means may exist for establishing this basis in England.

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there are no such means in Scotland. In Scotland, if they would give it you, they could not, they have not the means. It may be that after statistics have been in operation for some years, and the attention of farmers has been directed to the subject of averages, they might be able to give it, but in the mean time, they could not individually give you that which is the foundation of Mr. Caird's scheme, an accurate average of each crop for the last five years. I will prove that in this way: I thought it was exceedingly desirable last year to be able to give some indication how far the result of the harvest of 1854 might be above or below an average; I did not attempt to get each farmer to say what was his average produce over a series of ordinary years, that would at once have been going into the inquisition which Mr. Caird would like to avoid; but I said to the enumerators and committees, try and find out for me generally, in a rough way, how far the crop of 1854 is above or below the crop of an ordinary year. Even in that general way, in a considerable number of districts in Scotland the enumerator and his committee, although men appointed to the office on account of their skill and professional knowledge, were unable to give me any such report. And I may mention that in one of the two districts of Wigtonshire, Mr. Caird's own county, I failed in obtaining such information. Further, as I understand it, the rest of Mr. Caird's scheme, he proposes, having got this ordinary average, to determine how far the average of the current year is above or below the ordinary one, by applying to it the mean of the weather. I understand he takes the average of ordinary years, and according to what the weather has been, he determines how far this year is above or below that ordinary average.——(Mr. *Caird.*) I may be allowed to say, perhaps, that I only take the weather as a very important element.——(Mr. *Maxwell.*) The weather is an important element, but it is a very difficult element to judge of. We have no meteorological observations in Scotland, and we have no means of establishing what the weather has been, and, besides that, the mean weather may have been very excellent, but an unfortunate thunder shower at a critical time may have done a very great deal of harm. I look upon Mr. Caird's own superior intelligence and knowledge of these matters as having rather run away with him upon this subject, and that he expects farmers in general to be able to do all he can do himself. My general objection to Mr. Caird's scheme is that it is an estimate upon an estimate; his acreage is a fact I admit, but he has an estimate upon an estimate in this way: he has to estimate the average produce of ordinary years; that average must be necessarily an estimate, and then there is an estimate of the weather to be brought to bear upon the first, in order to get at the produce for the year. So that he gets at the produce of the year by means of two estimates, both of which, I think, would be apt to be fallacious.

312. Earl *Stradbroke.*] Do not you think that the weight of the corn for a particular year may be easily ascertained shortly after the harvest?

I do not think so; the weight of wheat alters very much as it is kept. Our estimates of the produce last year were flung back owing to the inquiry being new, and owing to our having started late, therefore many enumerators reported to me. Our estimate is late in coming in; but it is fortunate for the sake of accuracy this year that it is late; the weight by no means turns out what we expected from this year's harvest, and what it would have been returned at in the month of October probably, when we intended to have closed our estimate; therefore, after October, even a month's delay was of importance in leading them to avoid a little delusion which otherwise they would have fallen into. I would therefore avoid estimating at too early a period; but I do not think it would be wise to get into such details as are involved in questions of weight. If we could devise any scheme whereby we could correctly ascertain the acreage of the country, and estimate the number of bushels and tons each year raised upon the acreage, I think we should get all that was really useful for general purposes. No doubt it would be desirable to get the weight if we could, but I think it would be very difficult, and it could not be got early.

313. Are you aware that the weight varies one seventeenth between one year and another?

I know the variation is very great.

314. *Chairman.*]

314. *Chairman.*] Are the Committee to understand that your principal objection to Mr. Caird's plan is, that you think it would connect the obtaining of those returns with taxation, which you have always been desirous of keeping separate, and that if they were to be connected with taxation, it would ordinarily prevent your obtaining the information you require?

Yes, I think so; and I will state also another objection: the connecting of returns of acreage with anything like taxation, would in my humble opinion so alienate the farmers, whose assistance and sympathy we have in this matter, that we should no longer have them, as we now have them, working out the scheme; and if Mr. Caird's suggestion disorganized our committees for collecting the returns of the produce, I think it would be very difficult to supply their places. Our strength at present lies in this, that by means of the enumerator and the members of the committee, including a representative for every parish in Scotland, we are working out the measure by means of the farmers themselves, and we bring a weight of farming opinion and influence to bear upon the farming community, which has proved irresistible, and is one of the great secrets of our success; but if we attached the collection of the acreage to any compulsory measure such as is proposed, we should alienate very many people, dislocate the committees which have been formed, and render it necessary for us to consider some new means of forming our estimates of produce.

315. Would not the mode proposed by Mr. Caird enable you to make a return at an earlier period than you can under the present system?

I think it would not; Mr. Caird takes the same period to get the average that I do; he begins earlier, but he does not end earlier; his period is May, June and July; I take the first part of July alone for the issue and return of the schedule; I think it is objectionable to run the schedules over so long a period of time; if you issue some of them in May, and give a man till July to return the information, he forgets it. I shall this year send out the whole of the schedules on the 2d of July, and they are all to be returned by the 20th. By that time every crop is sown, and the shorter period you give people to make the return, the better; and the more generally you take it over the country at the same time, the better.

316. You stated that the only reason you could not get the information at an earlier period was, that you wished to include the turnip crop, the sowing of which is not completed till the end of June?

Yes.

317. If the turnip crop were omitted, you could make a much earlier return?

Yes; but I think it very important that it should be included.

318. Earl *Stradbroke.*] Is land in Scotland generally let upon long leases?

As a universal rule, you may assume that land in Scotland is let on lease; 19 years is a very common term.

319. Do not you think, where the leases are of a short duration, the farmers would have a possible object in deception in regard to the average amount of corn they had grown in the preceding year?

I think it would be opening a door to deception, though I am loath to attribute to them any disposition to deceive. My view is, that they would not willingly give you any such statement; and I scarcely think it fair to ask them to do so. I stated on Tuesday the fact, that in some counties in Scotland they had never till now been attempting to make any note of their green crop produce by weighing or measuring; and the enumerators have particularly requested me to draw their attention to that circumstance.

320. Lord *Mont Eagle.*] The objection in the mind of the farmers would apply, would it not, to the danger of the landlord seeing the return?

The return would not be shown to the landlord; but the difficulty is to make the farmer, especially a farmer who is disposed to deceive you, believe that other people will not deceive him, and that the return will not be shown to others. I think it much more likely, if there is to be falsification on the part

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of the farmers, that that falsification would exist as to the ordinary average which Mr. Caird proposes, and for the correctness of which we have no guarantee, than that it would exist in the return of the acreage to me, in which he supposes there is likely to be incorrectness, and as to which he says we have no test. There is the same want of test, certainly, as regards his ordinary average, that he attributes to my return of acreage; and I think there is a greater inducement to be incorrect in the first than the last. There is one observation which fell from a previous witness, which, if your Lordships will permit me, I will make a remark on. It refers to the correctness, I do not mean in point of skill or experience, but in point of honesty of the estimate. Mr. Pigott seemed to doubt as to the value of such estimates, because parties might have some object in falsifying them. I am quite ready to admit that speculative corn-dealers who, for their own purposes, privately make trials for the purpose of ascertaining what will be the probable yield of the harvest, may have an interest in concealing the truth, either by magnifying the yield or the contrary, as may suit their views; but such committees as we have in Scotland, I think, could have no such object; and there are too many of them working together to make it possible. Their object, appointed as they are as the representatives of their class, rather is faithfully to inform that class of the truth of what they are very apt to suppose the speculators would deceive them upon. Therefore I do not think Mr. Pigott's objection to the value of the estimate, on the ground of the parties having an interest to falsify the returns, is applicable to a large committee of farmers representing their county, and meeting together for the purposes for which they now assemble. There is only one observation I think I have left out. Mr. Caird thought his proposed mode of collecting the acreage would be cheaper than the mode now adopted in Scotland. The mode adopted only costs paper, printing, and postage.

JAMES CAIRD, Esquire, further examined:

J. Caird, Esq.

321. *Chairman.*] HAVING heard the evidence of the last witness, have you any wish to explain any portion of your former evidence?

Yes; with regard to Scotland, I think the objection Mr. Maxwell takes that the schedule I suggest would be regarded as a tax-paper, does not in the least degree hold, inasmuch as it is a tax-paper for county rates, and the rates in Scotland are almost entirely paid by the landlords. The farmers or occupiers have scarcely any interest in those valuation returns, and would make no objection to them. I think that is a sufficient answer to Mr. Maxwell's objection that my proposal of employing the county valuators would connect the statistic returns with taxation.

322. The valuators are officers appointed by the authorities of the county, and not appointed by the Government?

They are appointed by the authorities of the county, and the occupiers have no hostile interest, inasmuch as they are not taxed by them, except for their share of the poor-rates, and the valuation for poor-rates would be ascertained precisely in the same manner as at present. With regard to the impossibility which Mr. Maxwell says there is in ascertaining the averages, and the instances which he has adduced from Scotland, in which his inquiry on this point was not answered, I beg to state that the distinction is very obvious. If you ask a man, as he did, to tell you the average produce of a hundred different farms in half-a-dozen different parishes, he may very probably say, I cannot tell you what it is, but if you ask him to tell you the average for his own farm, he will have no difficulty whatever in doing so. I never found any difficulty of that kind in my inquiries in England. Mr. Maxwell seems to think that farmers do not know that, even in their own case; but I beg to ask how a man could hire land at all, if he did not ascertain its quality by its relative produce to other land. It is because one acre yields so many bushels more than another that it brings a higher rent. The first point a man would inform himself on would be, "What is the average produce of this land naturally?" He would be ignorant

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of his business if he did not know what the average produce was of the farm which he held.

323. Do not you think there are a number of small farmers in England who keep no books, and who would find it very difficult to give you that information; and in those cases, what means would you have of testing the accuracy of the returns which might be made?

At first you might have no means of testing the averages, but in the course of years you would come to have a very perfect means. That at any rate is of minor importance in comparison with the return of acreage, which, being not estimate but fact, admits of being tested in the manner I have already described. I do not think there are many farmers who do not keep books of some kind; and I may say further, that I have found the English farmers more correct in their book-keeping than the Scotch farmers, and I have had very numerous opportunities of ascertaining that. If you find a small farmer who occupies only a few acres, and keeps no books, we all know that every bushel such a man has will be the more carefully counted, then registered in his memory, and easily averaged.

324. Admitting that farmers are able to give you the average amount of corn grown upon their farms, do you believe they would be willing to do so?

That is a different question; I am now supposing that the returns are to be compulsory, and not merely voluntary; I do not see, moreover, the objection which they would feel to giving such information; it could not be used against them if collected as I have proposed; it is given to a confidential officer for public purposes, and does not become the subject of conversation among their neighbours at the Board of Guardians.

325. Lord *Mont Eagle.*] Do not you generally let land in Scotland by tender to the highest bidder?

Yes, not infrequently, when there is a change of tenancy.

326. Therefore it would not so much signify whether the landlord knew it or not in a case of that kind?

I do not say that; farmers may reasonably object to give their landlords such information, and it would be proper to adopt a plan which should preclude that objection. In reference to the objection which Mr. Maxwell took, that the plan I proposed would occupy so many months, that could be obviated at once by employing more collectors; if 200 collectors do it in three months, a certain proportion more would do it in two months; you do not alter the total amount of the expenses, but only the number of the people who are for a proportionally shorter time employed. His objection to leaving schedules for a lengthened period does not hold in my case, as I do not propose to have any schedules. Mr. Maxwell seemed to say that there was some test at present in Scotland, and that I ought to know that, from having acted on his staff in my own county. I may say that I felt it my duty (being in the county when he visited it for the purpose of explaining the matter to the farmers) to do everything in my power to assist the Government in this inquiry. Having gone to the meeting which Mr. Maxwell has referred to, I acted as chairman, and assisted him in explaining and enforcing his views; and the gentlemen then present insisted that I should myself act, which I consented to do with great pleasure. But I told Mr. Maxwell then, and still maintain, that he has no test of accuracy. The whole of the returns were sent direct to Edinburgh; they were never sent back to us, and we never had any means of testing their accuracy.

327. The Committee understood from Mr. Maxwell that the test which he had was of this kind: he applied to individual committee-men having received these returns, who themselves formed an estimate of the average in some particular district, which tallied with the return which was sent to Edinburgh?

I was not aware that that had been done.

328. That would be a mode which could be adopted, would not it?

Yes, if the returns which are sent to Edinburgh were sent back to the country to be tested, it might be practicable to do that, in so far as the estimate of average is concerned; but that is a secondary point; and Mr. Maxwell seems to misapprehend my plan, when he describes it as an estimate upon an estimate.

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It is an estimate on a fact; an estimate of produce on an ascertained acreage, which is all that can be got by any plan whatever. I wish to say that I do not in the least degree desire to appear in antagonism to Mr. Maxwell; on the contrary, I think he deserves very great credit for the spirit in which his system, such as it was, has been carried out in Scotland.

The Witness is directed to withdraw.

Ordered, That this Committee be adjourned to To-morrow, at One o'clock.

Die Veneris, 22° Junii 1855.

LORDS PRESENT:

Lord Privy Seal.	Lord Lovel and Holland.
Earl Doncaster.	Lord Mont Eagle.
Earl Carnarvon.	Lord Colchester.
Earl Harrowby.	Lord Portman.
Earl Stradbroke.	Lord Stanley of Alderley.
Earl Burlington.	Lord Monteagle of Brandon.
Lord Berners.	

LORD STANLEY OF ALDERLEY in the Chair.

Evidence on the best Mode of obtaining accurate Agricultural Statistics.

J. H. Maxwell, Esq.

22d June 1855.

JOHN HALL MAXWELL, Esquire, further examined as follows:

329. *Chairman.*] DO you wish to make any addition to your former evidence, or to lay any further statement before the Committee?

As I was a little unprepared the first day, there are a few points which I should like to recur to. If the returns of acreage which the Highland Society obtained in 1853 and 1854 were critically examined, very important discrepancies would appear. These are susceptible of explanation; but if discovered and not explained, they would naturally weaken the confidence which might otherwise be reposed in the system which has been adopted. I will first state what the discrepancies are, and then explain them. The gross acreage return for Roxburgh in 1854 was 46,358 acres more than in 1853; in Haddington, the gross acreage was 6,544 acres in excess; and in Sutherland there was a decrease in 1854, as compared with 1853, of 395,137 acres. These are very startling discrepancies, no doubt, but they are easily explained; and I conceive that the explanation goes to fortify the course which the Society has since taken, in expunging from the schedule the columns referable to the acreage of permanent pasture and sheep-walks, because I find that the whole of the discrepancies are to be found in those columns. In the first two counties, therefore, the farmers have apparently been endeavouring to do what they have not ventured to do the first year, namely, to guess at uncertain and unascertained amount of acreage. In Sutherlandshire, again, they had to a great extent, in a haphazard way, attempted to give the pastoral acreage the first year; but the second year they seem to have abandoned it as useless, and to have given me only that which we are now going to ask from them, the acreage under tillage. I prove this by taking the tillage columns of 1854 and 1853, to which we mean to restrict the schedule of 1855; I add them up in each of the three counties, and compare the results for the two years; I find that the Roxburgh excess dwindles from 46,000 to 338 acres; Haddington dwindles from nearly 7,000 to 336 acres; and in Sutherland, instead of a decrease of several hundred thousand acres, there is an increase of 280 acres. Now those few hundreds in each of the counties are so trifling, that they can be well accounted for by accidental variations in the cropping of the different counties. Therefore, I conceive the conclusion is, that while returns under queries, such as this year's inquiry is to be restricted to, can be looked on with confidence, if you introduce pasture lands into the statistics of an unsurveyed mountain region, as many parts of Scotland are, you tinge the whole thing with that uncertainty which induced the Society to abandon that part of the inquiry, and which apparently makes

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the comparison between 1854 and 1853 in those three counties so unsatisfactory. There is one other point which has attracted attention, and which has been repeatedly founded on as indicative of the inaccuracy of our estimates of produce. Sir John Walsham communicated to me a conversation which occurred at one of his Boards of Guardians. One gentleman remarked that the Scotch returns cannot be worth much, in respect that the estimates of produce for Caithness and Sutherland show a greater acreable yield of wheat than in Haddington. Another gentleman stated that, in his opinion, this was confirmatory of the accuracy of the returns. Now, that gentleman must have known more of farming than the first. The acreable yield of Caithness was estimated at 36 bushels of wheat; in Sutherland at 34; and in East Lothian at 32; but then in East Lothian there were 17,881 acres of wheat; in Sutherland there were 299; and in Caithness there were 129; so that in Caithness and Sutherland wheat was an exceptional crop, grown upon the best soils, and probably more kindly treated than the ordinary run of the other crops; while in East Lothian wheat forms part of the usual rotation over the county. I will illustrate this by a very extreme case, which does not appear upon the Report. I was surprised to find an estimate for wheat in the Report from the island of Mull, and I was still more surprised to observe that it was much higher than even the estimate for Caithness. I know Mull pretty well, and I was not aware that wheat was grown there. At all events I was not prepared to learn that it throve better in one of the wettest of the Hebrides than in East Lothian. However, on examining the acreage returns, I found that the extent under wheat in Mull consisted of half an acre or a quarter of an acre, grown in the garden of a gentleman, who has a theory that Mull should produce as good wheat as East Lothian; but I took the liberty of scheduling this gentleman's wheat under the head of "Gardens;" so that wheat forms no part of the statistics of Mull. I will now state that when I compared on Tuesday the estimates of the acreage which had been formed by Sir John Sinclair and Mr. M'Culloch, as compared with the acreage ascertained under our inquiry, I stated that I had not then the means of adding to ours the acreage of cultivated land in the hands of small holders, but that that addition would bring us very near to Sir John Sinclair's estimate in 1814. I have here the draft of the Report respecting small holdings, and perhaps I may be allowed to read it. It is addressed to the Secretary of the Board of Trade, and is as follows: "Sir, I am now enabled to close the inquiry into the agricultural statistics of Scotland for 1854, by submitting to my Lords of the Committee of Privy Council for Trade, returns applicable to that class of agricultural occupants not included in my Report of the 23d of January. It will be in the recollection of my Lords that it was considered inexpedient to ask information directly from the smaller tenants, from an apprehension that many of them would be unable to comprehend the inquiries made, and to complete the schedules served on them, and that it was resolved to obtain through other channels general returns in reference to their holdings. In determining the point where the issue of schedules should cease, it was found necessary to draw a distinction between the Lowland and the Highland districts. In the former it was believed that schedules might safely be sent to all persons paying a rent of 10*l.* and upwards; in the latter it was represented that it would be unavailing to seek direct information from parties rented at less than 20*l.* The tables appended embrace returns for occupants under 10*l.* in 26 counties, and for under 20*l.* in seven counties. There is thus apparently a county in excess, which arises from Bute and Arran having been divided, the one island being placed in the 10*l.* and the other in the 20*l.* category. I should further mention, that in Caithness schedules were originally served on all occupants at 10*l.* and upwards, but that owing to the nature of its crofter population, it has been found advisable to alter this arrangement, and to apply the 20*l.* rule. The present returns, therefore, repeat a certain extent of acreage and amount of stock included in my former Report; and in order to prevent an over-estimate of the statistics of Caithness, there must be deducted from the first return 7,480 acres and 5,604 head of stock. Owing to the number of small occupants to be dealt with, almost equalling that of the tenantry of the country, and to the difficulty of finding the proper parties from whom to obtain information, the preparation of the returns now submitted has involved a greater amount of time and labour than was anticipated. It is just, however, to record that, under this section of the inquiry, I experienced the same co-operation, and received the same assistance as I already have had occasion to report upon so favourably to my Lords; and I cannot but avail

avail myself of this opportunity to state the obligations under which the public lies, not only to the farmers officially engaged in conducting the inquiry, but to the many proprietors, agents, factors of estates, inspectors of poor, and others through whose assistance the returns have been compiled. Every precaution has been taken to make the returns as accurate as possible; they are necessarily of a more general character than those made by schedule, and, in some respects, they are rather approximate to, than strictly statements of, the fact. In most cases the exact number of occupiers could be correctly ascertained, and has been accurately returned; stock also was susceptible of a strict enumeration; acreage, on the other hand, had frequently to be estimated. In Shetland particularly the returns of acreage must be taken with considerable allowance. I had the advantage of obtaining from most of these islands very intelligent returns, carefully prepared by the parochial schoolmasters, and embracing valuable information; but as the land is there almost exclusively held under the 'merk,' a Norwegian measure of extent, of fluctuating character, it was frequently difficult to arrive at correct data for determining acreage. I have already informed my Lords that it is not proposed in the meantime to repeat these returns. The variations incidental to such small holdings, and the extent to which they could affect the general results, as regards the stock and crop of the country at large, are too immaterial to necessitate the labour and expense which an annual repetition of this section of the inquiry would involve." Without going through the figures, I may state that the number of those small holders is 42,229; the number of acres under cultivation, 238,170; and the stock, 334,308. When I name "stock," it reminds me of a question which one of your Lordships put to me, and which I could not exactly answer at the time; I was asked what proportion this stock might bear to the stock of the country at large. It is as about 330,000 to 6,000,000; so that the proportion is very trifling, and any alteration in the 330,000 could not effect, on a number of years, the 6,000,000.

330. From the information you have obtained, the whole amount of stock in the hands of occupiers under 20 *l.* a year amounts to 334,000?

Yes; under 20 *l.* in the Highlands, and 10 *l.* in the Lowlands.

331. Lord *Colchester.*] In the table you have put down the seven and a half acres of wheat, but you do not put any price to it?

I have published an estimate for Orkney since, but for Shetland I could get no estimates.

332. *Chairman.*] Is there any wheat grown in Shetland?

I do not think there is; I think there is only one tenant in the whole of Shetland who pays above 20 *l.* of rent. I may state, that adding the acreage of those small holders to the acreage returned under the first report, we show, as under, cereals and root crops, and in fallow, 2,210,321 acres, as against the 2,505,225, estimated by Sir John Sinclair. Our return, founded on fact, is not very far from his estimate.

333. How does your return stand as to produce in comparison with the previous estimates?

I have already stated that, in estimates of produce, Mr. M'Culloch and the Society are very near each other; we are rather above him. I would observe, in reference to another point, that on reading over my evidence I find I have dwelt somewhat strongly on the advantage of sending schedules out by, and having those schedules returned to me, or any other central officer who may be employed, in preference to employing for that purpose local officers; but I find that that advantage, as stated by me, stands a little too strongly on my own opinion. I neglected to state, that at the meeting of enumerators and members of the committee, which was held early in March, before which I brought all the proposed arrangements for 1855, this point was mooted by me. I stated that I had had suggestions from one or two quarters that it would be better to send the schedules through the hands of the enumerators, and have them returned to them, rather than to have it done through my office, and I put it to the meeting to express their opinion upon that point. I had no sooner done so than one of the enumerators, Mr. Wilson of Edington Mains, whom his Grace the Duke of Buccleugh knows as an experienced and influential farmer, stated that his objections to any

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such course were so strong that, if persevered in, he would at once resign his office of enumerator, and disconnect himself from the inquiry. That was the unanimous feeling of the meeting, and it was resolved that the schedules ought to pass through my hands and not through theirs. I wish to state that as a confirmation of the opinion which I expressed on a former day.

334. That opinion being, that you attribute a great portion of the success to the fact of the communications being made to you instead of to one of their neighbours, or to an officer of the Government?

There were many other elements of success. I meant to say that the experience we had in 1853, and the difficulties which arose in sending the returns to the enumerators, induced us to depart in 1854 from that course, and before we entered on 1855 we put it to the enumerators and the members of the committee whether we should revert to the old plan, or adhere to the plan of 1854. Their opinion was unanimous in favour of the 1854 plan. There is one observation I should like to make with regard to the point of compulsion as affecting Scotland. If the measure were made compulsory in Scotland, I conceive the Highland Society would require to give up the charge of the inquiry. It could not well, from its position and constitution, be the agent in carrying out any compulsory measure; and, what is more than that, I conceive the whole machinery which has been called into existence would at once cease, because farmers would not, I think, as members of the committee and enumerators, not continue to act as instruments in carrying out a measure which might involve their neighbours in the penalties which a neglect of the provisions of a compulsory Act might bring upon them. I conceive that a system of compulsion in Scotland would render it necessary to organise a new and different machinery from that which is now in existence.

335. With the present machinery, compulsory powers, you think, are not necessary in Scotland?

They are not; and I think compulsion is incompatible with the continuation of the present machinery. I should like before retiring to make a single remark upon Mr. Caird's evidence. Without going into the question of whether it would be difficult to get at that ordinary average which is the basis of his plan, or whether it would be difficult to get at that estimate of the weather by which he is to test how far the year's crop is above or under that ordinary average—I neglected yesterday to observe what Mr. Caird seemed to have overlooked, viz., that the weather is by no means the sole agency affecting the annual excess or deficit of the crops. There are many diseases which crops of different kinds are incident to, particularly root crops, such as potato disease, finger and toe in turnips, &c., which we do not know to be attributable to the weather, or if attributable to it, we do not know under what peculiar circumstances of weather they are produced. Therefore, with regard to such points, the weather would be no test at all. With regard to a suggestion of Colonel James the other day, I wish to state that his plan, I think, originated with myself, in a communication with Lord Elcho, before we commenced to take the whole of Scotland; it occurred to me that, if the farmers refused to state their acreage, we might not get it by means of a map; but of course if the farmers would give the acreage, it is a much easier mode of getting it than by means of a map; and I am quite convinced of this, that Colonel James under-estimates the difficulty of not only indicating the boundaries of each property, but of indicating the boundaries of every different farm, which would be necessary under his plan. He stated, that if the Duke of Buccleugh allowed him, he would show the boundaries of all the farms upon his estate in a fortnight. I think that Colonel James very much under-estimates the difficulty of doing so. Besides that, I know there is a jealousy in Scotland as to putting too much discretionary power into the hands of surveyors on points which surveyors are not good judges of. We have a jealousy of allowing an engineering staff to do anything which may determine indirectly the limits of property.

The Witness is directed to withdraw.

WILLIAM

WILLIAM TORR, Esquire, examined as follows:

336. *Chairman.*] YOU are largely engaged in agriculture?
I am.

337. In what counties do you hold land?
Chiefly in the county of Lincoln. I hold 1,300 or 1,400 acres there; and I am also managing a large farm in Surrey. I have also some land in Cheshire.

338. Have you turned your attention to the question of agricultural statistics, and its importance to farmers?
I have.

339. Do you consider it of great importance to the farmer that he should have an accurate knowledge of agricultural statistics?
I do.

340. Is it your opinion that the mode which has been pursued during the last year by the Poor Law Commissioners is the best mode which can be adopted for the purpose of obtaining information, or is there any other mode you can suggest to the Committee which you think preferable?
As far as my observation goes in the county of Lincoln, I do not think the Poor Law Unions the best means of obtaining it.

341. What course would you recommend?
Since I had notice of this examination, I have endeavoured to draw out a plan which I think would be more practicable.

342. Will you be so good as to state it to the Committee?
In the first place, I must say that it is quite new in the county of Lincoln to collect any agricultural statistics whatever. We have had nothing done, to my knowledge, through the Poor Law Unions which has been done in other counties; but knowing the character of our Poor Law relieving officers who have been collectors, I am quite certain they would not be competent to carry it out in the county of Lincoln. The class of farmers in Lincolnshire are mostly large occupiers, and they would consider at once that the Poor Law relieving officer was not a man of sufficient standing or local knowledge for them to pay much attention to him. In the first place, any plan to be adopted in our county must be, to a certain extent, compulsory upon the parish to make the return; and I think the assessor of taxes is the most suitable person to make the first return. The fact that he has before him, for the property tax, the returns under Schedule A. and Schedule B., fit him for the position; he has generally the knowledge of farming to begin with; he is also generally a very respectable person; and he is acquainted with the smallest matters in the parish. I consider that the return, when made to him, would not be complete unless it were again checked before it left the district.

343. What is the nature of the return you would require the assessor to make?
The first return would be the number of acres cultivated in each parish; the description of crop upon it; and the quality and character of the crop on a certain day in every year; but not the estimated quantity per acre.

344. Would it be part of your scheme that the assessor should fill up those papers without communication with the occupier?
No.

345. Is he to submit those schedules to the occupier?
I propose that he should ask for the forms either from the inspector of a district or from the magistrates assembled in petty sessions. Having got those forms, he will distribute them to the parishes, and collect them, and fill up his own schedule, with remarks.

346. Is the farmer to fill them up, or is the assessor to do so?
In the first instance I think the farmer ought to fill his schedule or duplicate; and if he fail to do so, there should be a report that they were not properly filled up.

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347. Lord *Monteagle* of Brandon.] Do not you apprehend that the introduction of the tax-gatherer as a medium of procuring the returns would add to any jealousy which may at present exist, and augment the difficulty of procuring such returns?

I think not. It has been suggested, that the check which should be employed should be by means of a district inspector at a fixed salary; a district being taken which would be suitable for the purpose. The return might be made to him or to the magistrates in petty sessions.

348. *Chairman.*] What would be the advantage of employing the assessor instead of the clerk of the Poor Law Union, if the only action he is to take is to prepare the papers, to transmit them to the occupier, who is to fill them up, and then receive them again?

It would be highly necessary, if those returns were made, that they should be collected in one day. The relieving officers cannot do that. If the assessor were bound to make the return on a certain day, he would prepare his forms; and those would go away for each parish on a certain day to the inspector of the district, or to the magistrates in petty sessions.

349. If the returns are meant to be made by the occupier filling up the papers, cannot they be equally filled up in one day, whether they are transmitted to the assessor or to the relieving officer?

Perhaps they might, but I think not so effectively.

350. Lord *Portman.*] The assessor of the parish, I presume, is a man in a higher position than the relieving officer?

He is so in our county, very much so.

351. *Chairman.*] In stating that you consider this a preferable plan, do you confine yourself to speaking of Lincolnshire, or should you express the same opinion with respect to other counties?

Decidedly, I should extend it to other counties.

352. Would it be applicable to the county of Surrey, in your opinion?

I think it would, but I have not much knowledge of Surrey.

353. Earl of *Stradbroke.*] Have the farmers in Lincolnshire the same absence of respect for the clerk of the union that they appear to have for the relieving officer?

They would have in this instance.

354. Lord *Berners.*] By employing the assessor, would not it increase the jealousy which the farmers feel of these returns being made use of by the Government for the collection of taxes?

I think not, for this reason: if it were first made compulsory upon the parish, to a certain extent, to do it, and to pay the expenses of collecting informatiou, it must be borne in mind that the assessor is usually nominated by the parish. If an assessor were unpopular in his parish, and did not perform his duty, we probably should not keep him in his office.

355. By employing a person connected with taxation, would not it tend to increase the jealously of the farmers as to giving returns?

Not at all in agricultural districts. The assessor of a parish is a very different man from a district surveyor or a collector in a town; he is generally a farmer in a parish, or a person very conversant with accounts.

356. *Chairman.*] At what period of the year do you think the returns should be made?

I am coming to that. My next idea would be to confine the returns to occupiers of not less than five acres of tillage and ten acres of pasture. A party refusing to make the return to be reported to the superior authority.

357. Earl of *Stradbroke.*] Should there be any penalty, in your opinion, in case of neglect or refusal?

I think the power of the inspector of the district to appoint a person to take the return would be sufficient. I have thought a good deal as to the time at which the return should be made, and there appears to be a great deal of difficulty in getting the returns in on one day. First of all, I thought the 6th or

8th

8th of August would be the best day, supposing cattle were to be included in the return as well as corn.

358. *Chairman.*] Do you consider that it is a matter of importance to obtain a return of stock as well as of agricultural produce?
Decidedly.

359. Lord *Portman.*] Every year?
Every year if the return of corn be taken.

360. Lord *Monteagle* of Brandon.] And of the green crops too?
Yes; the return of the green crops checks any mistake which may be made in the cereal crops. The return of the cattle shows whether land is going into cultivation or out of cultivation, especially with respect to sheep.

361. Lord *Berners.*] On the same ground would you recommend that a return should be made of wool?
Decidedly. The 8th of August appears to be that period of the year when stock is at its fullest and fairest distribution all over the country. After that date large quantities of stock migrate, especially from Scotland; therefore some counties would, after that time, be almost deprived of their stock.

362. Earl of *Stradbroke.*] Do not you think it would be absolutely necessary to have the same day fixed for every county in England?
Yes, I think so. I would take the 6th or 8th of August with respect to stock. Lambs then have become sheep, and may be returned under the head of sheep; cattle are then in the possession of the graziers, without materially having altered their position. After that time a considerable change takes place in very important districts in England as regards stock. The objection to the 8th of August is, that it hardly shows sufficiently the prospects of the harvest.

363. *Lord Privy Seal.*] Cannot you separate the returns of cattle from the returns of produce?
If it were thought by the Legislature desirable to do so, that would be a more correct means of obtaining the information. The next date would be 11 October; then you are able to obtain a better notion of the yield of the harvest; and if there have been any diseases which occur in the early ripening of the harvest in precarious times, it will have been ascertained. Against that is to be set the fact that the return of stock will not be quite so correct. The result might be the same over the whole of England, but it would not apply to the places where the stock ought to be. The forms to be filled up for stock, I think, should be divided into "breeding," "feeding," and "milking" stock. With regard to the forms for corn, supposing the date to be the 11th of October, my idea is that they should be "full crop," "average crop," and "short crop," without going into the number of quarters, and a statement which was autumn-sown wheat, and which was spring-sown wheat.

364. Lord *Portman.*] How would you find your average at starting?
That is a matter of very considerable difficulty. I am quite aware that at the first introduction of the measure into my county, there would be great attempts to evade the statement of an opinion as to the number of quarters per acre; and it would be much better if you could get a farmer to state whether the crop is a full crop or an average crop, or a short crop, with truth, than that he should state the number of quarters with untruth.

365. If you take these three heads, some one must give you a notion of what the average of the county is; how would you arrive at that?
I think the farmers of the county generally would give you something like the average of their own district. I remember when I first came from school we considered three quarters a full average, but now we consider four quarters to be the average. It strikes me that in a large county like Lincolnshire, if you have a district inspector, he would at once know from his own practical knowledge whether the crop in the neighbourhood was an average one, and if the returns did not correspond with that, he would at once look into it.

366. Earl of *Stradbroke.*] Do you think the farmers would feel any objection to make a return of the actual quantity which they had grown in any particular year?
I am sure they would in Lincolnshire.

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367. *Lord Privy Seal.*] All you can expect them to give you is the number of acres under a given crop, and a general statement of whether they consider it to be a fair average?

Yes, and you must take your own opinion from that.

368. Earl of *Stradbroke.*] That argument you think would apply to Surrey as well as Lincolnshire?

As far as I have seen of Surrey. I am not so intimately acquainted with Surrey as I am with Lincolnshire. With regard to any date to be fixed on for collecting the average of the harvest, it must be remembered that a late harvest would interfere with such a date very much.

369. Lord *Portman.*] In the returns which have been contemplated there are two divisions, the facts and the estimates. The facts are, that a given number of acres are under a certain crop. The estimates are obvious. Do you see any objection to collecting the facts in the month of June, and the estimates in the month of October?

None. I should be rather in favour of it. You might get the information a little earlier; you might get it about the 13th of May.

370. Earl of *Stradbroke.*] Would not that make a difference as to the turnip crop?

No; the turnip crop on the 13th of May would be settled.

371. Would you be able to distinguish between turnips and mangold-wurzel?

Certainly. If a man is anything like a farmer, he is quite certain what he will do with his land.

372. Lord *Portman.*] Do you see any objection to obtaining the facts with reference to the quantity of stock at that time of the year?

There is a slight objection with regard to lambs, but I do not know that that would be any great objection if the plan were thought a desirable one.

373. *Chairman.*] What has been your experience with reference to the present mode of obtaining the Corn Law averages?

As far as we have had corn averages, they are not worth a farthing.

374. In saying that, do you mean they are not worth a farthing as regards the quantity sold, or in regard to price?

The quantity sold or grown. They are a nearer approximation as to price.

375. Can you propose any other mode by which you might arrive at greater accuracy as to the price of corn?

I do not know that I could in reference to price; but as to quantity, I am quite satisfied that a great improvement might be made in the returns. I would have the sellers make the returns as well as the buyers.

376. Earl of *Doncaster.*] Are yours sample markets?

They are.

377. *Chairman.*] How would you provide for the case of corn, which was not sold at market, but was sold between the farmer and the miller?

The farmer should be obliged to make a return the following week of that corn.

378. You would require in all cases the seller of corn to make a return to a corn inspector of the amount of corn he has sold, and the price at which he has sold it; whether it was sold at market or in some private transaction?

Decidedly.

379. Do you think there would be any objection on the part of the farmers to make such returns, if they were required to do so by law?

I do not think there would. A man never makes any great secret of such transactions; but the returns from our small country markets are very inaccurate indeed.

380. Lord *Portman.*] Would not there be an advantage in the seller making a return rather than the buyer, in this way,—that you would then know the first sale of the corn, and would not have the same corn brought into the averages half a dozen times, as you may have now?

Decidedly.

381. Lord *Berners.*] Would you have the returns made solely from the sellers?
I desire rather to check the present inaccuracy of the returns; and if you get a return from the seller, it would answer that purpose. The inaccuracies at present are very considerable.

382. Lord *Portman.*] You speak of the seller having been the grower?
Yes. With regard to the number of fleeces, they would come in in June, if the returns were made at that time; and I would have the acreage of every man's occupation taken.

383. Earl of *Doncaster.*] There is, of course, a great difference in fleeces with regard to the description of sheep from which they are taken?
Yes. You would have a statement in the schedule what sheep they were. The number of fleeces is one of the best criterions of the quantity of stock on a farm at a certain period, because they are all taken off in the space of a very short period, and it would be a material check on the returns of sheep.

384. Lord *Portman.*] You say, in the first instance, it is necessary that this measure should be compulsory?
As far as my own county goes, I think to a certain extent it must be so.

385. Supposing that for the next five or six years some plan were adopted which was made compulsory, the period for taking the Census would then have arrived. Should you be of opinion that after this period of preparation a return taken at the time of the Census in 1861 would be a sufficient guide for the 10 years following as to the probable quantity of land in cultivation in your county, having, as one column of the Census return, the average rotation?
If I were to answer that question by going back for the last 10 years, I should say it would not. The alteration of our cultivation, the large quantity of grass land taken into tillage, and the great improvements we have made, would not give you a correct basis for anticipation for 10 years.

386. Earl *Carnarvon.*] You said you thought it would be necessary to make this measure compulsory in your own county?
Yes, to a limited extent.

387. You said that, did you not, with the knowledge that the subject had been a good deal mooted and talked of in Lincolnshire?
Yes.

388. How was the measure generally received by the farmers there?
I cannot speak favourably of that. I think when they became more acquainted with the system, if they were not obliged to state the number of quarters per acre, their objections would be materially removed. If you were to require them to state whether their crop was a full crop, average crop, or short crop, it would be a stepping-stone to something beyond.

389. Earl of *Doncaster.*] If they had to give the quantity and the price at their market, would not that be a pretty strong indication of what they grow?
There would not be any great objection to that; but it does not show the quantity grown. The chief objection of the farmers, as far as my experience goes, is to state the quantity grown per acre.

390. Lord *Mont Eagle.*] Do you think the farmers would have the same objection to give the information, whoever might be the person to whom it went from them: if the returns were taken by a total stranger to the parish, would there be the same objection on the part of the farmers?
I think there would be a still stronger one. They would prefer to return the information to an officer in their own parish, and if that were properly checked, it would be a valuable return.

391. Earl of *Stradbroke.*] In your opinion, the farmers in Lincolnshire are not perfectly alive to the advantage to be derived from making an accurate return of all the corn grown in England?
I am free to admit that to be the case.

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392. Lord *Colchester*.] You stated that you thought the assessor of taxes was the proper person to collect this information; do you mean the assessor of Queen's taxes?

Yes

393. He is not an officer chosen by the parish, is he?

He is commonly nominated by the parish; the nomination goes before the Commissioners of Taxes, and he is appointed by them.

The Witness is directed to withdraw.

Sir ROBERT ALEXANDER FERGUSON, Baronet, a Member of the House of Commons, is examined as follows:

Sir R. A. Ferguson, Bart., M.P.

394. *Chairman*.] ARE you acquainted with the course which is pursued in obtaining annual agricultural statistical returns from Ireland?

Since I received an intimation that it was the wish of the Committee that I should attend here, I have been looking more minutely into the different papers which have been presented since the year 1847, which was the first year of the returns upon that subject.

395. Will you inform the Committee whether, in your opinion, the result which has been obtained has been satisfactory as to accuracy, or whether there is any other plan which you can suggest which would better enable the Government to obtain the desired information?

I had not looked very minutely into the question of accuracy until I saw the returns of 1853, in which I perceived that one of the unions in the county of Tyrone, the union of Gortin, was brought prominently forward as one of the ten giving the largest quantity of cereal produce, in reference to the number of its inhabitants, in Ireland. Knowing that it was situated in the mountains, and that the system of agriculture in it was very bad, I was induced to compare it with some of the adjoining unions, and I found that it brought out a result which made me very much doubt the accuracy of the returns. Taking the four unions of Castlederg, Gortin, Strabane, and Stranorlar, I found that the union of Gortin, which is valued to the Poor-rate at 15,702*l.* a year, had a larger number of tons of corn, beans, and peas in each of the years 1851, 1852, and 1853, than Stranorlar, which is similarly circumstanced, and valued at 29,166*l.*; and that Gortin was also represented to have had a larger number of barrels of potatoes in two years of the three above-named. The returns of acres under produce are made up from returns by the constabulary, and it appeared to me, that the returns by the constabulary should be checked by some local authority; and in communication with Dr. Donnelly last year, I suggested to him that they should be checked by the clerks of unions, who had in their possession the different valuation books and the rate books, which they received from the collectors, which they made up constantly from the valuation, and who, generally speaking, had a very good knowledge of the unions to which they were appointed. I thought they would be fully competent to execute that work. It struck me, on looking into the details, that they were given with much too great an attempt at minuteness; as, for example, they include poultry. In 1847, when they began, they took the returns of stock in five classes of farms. The first was stock belonging to householders and parties holding less than an acre; then there was a second class above one acre, and not exceeding five; the third was above five acres, and not exceeding 15; the fourth was above 15 acres, and not exceeding 30; and the fifth was above 30. The stock was taken in that way, but the crop was generally taken by townlands, and published in a printed volume by electoral divisions, which were afterwards divided off again into baronies and counties as well as unions. The returns of the first three years were made under the Board of Works; and Colonel Larcom, who is now Under Secretary in Ireland, was the officer who signed the returns. In taking the Census of 1851, those returns passed under the hands of the Census Commissioners, and then there was a great increase in the number of the returns, and in the classification of the farms, which were then divided into nine classes; those above 30 acres being divided into four classes.

The

The last year's return is signed by Mr. Donnelly, as Registrar-general. It struck me if this system of agricultural statistics were to be continued, it had much better proceed under the direction of the person entrusted by the Lord Lieutenant with the general valuation of Ireland. The Act for the General Valuation of Ireland authorizes the Lord Lieutenant to appoint one or more Commissioners to preside over the general valuation of Ireland. He has entrusted it to one gentleman, Mr. Griffith, and, I think, very properly, as it must lead to much greater uniformity in the valuation than if there were a number of people employed; and it strikes me that these returns would be more correctly made, and be of more general use, if they were sent in to his office and made up there.

396. What are the duties of the Registrar-general or of the valuator whom you propose to substitute for him?

He is the Registrar-general of Marriages in Ireland; I propose to place him under the Chief Commissioner of Valuation.

397. Earl of *Stradbroke.*] What check would Mr. Griffith have for the purpose of ascertaining whether the returns sent to him were correct or not?

The first check would be that they would be passed to him by the clerks of unions, who, being paid for it, would be responsible. Besides that, in the unions in which the tenement valuation is in use, and they extend at present to 75, Mr. Griffith has to make every year an inspection for the purpose of correcting the tenement valuation, so as to make it a valuation for assessment. The clerk of every union is required to make to him, at particular seasons of the year, returns from his union, stating what changes there have been in the farms or the houses in any part of the union. If those changes are of sufficient importance, Mr. Griffith is bound to send down a person, at the cost of the district, to examine into and report upon those changes, so that his valuation and list of occupiers shall be made up at a particular season (I think the period of the summer assizes) of each year, for taxation for the ensuing year.

398. The unions in Ireland are much larger than they are in England, are not they?

They were much larger at one time, but the number has been increased from 120 to 163, and the consequence is that they are now very considerably smaller than they were.

399. Is not the duty of the clerk of a union in Ireland very onerous, particularly in the south of Ireland?

I am not so much acquainted with the unions in the south of Ireland, but from the amazing diminution in the number of poor, I do not think their duties are now very onerous; certainly not so much so as they were a year or two ago. The poor being entirely in-door poor, his attendance is required; but I do not think his duties are so onerous as they were.

400. Lord *Mont Eagle.*] Will not the revision of tenements every year very much increase his duties?

Even at the present time, each clerk marks in his collection-book every change of occupation. For the purpose of making out the new rates, he is obliged to do that now.

401. Earl of *Stradbroke.*] Are you aware that in the unions of Limerick and Clonmel there are about 1,300 people in each poor-house?

I am not aware of the number.

402. And that the inmates vary from week to week very much, all of which would occasion trouble to the clerk of the union?

It must do so to some extent. That, however, occasions trouble to the master rather than to the clerk.

403. *Chairman.*] Do you think it would be the preferable mode to obtain the returns for unions or for townlands?

They must be made up by townlands. I think the clerk of the union is a better person to bring them in to, for the purpose of their being collected, than any other person I can suggest in Ireland. We have no superintendent of the collection of a county rate who could do it in so efficient a way as the clerk of the union.

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404. Do you think it would be better to leave the immediate collection of the returns to the police, who are now employed?

I do not see any other class of persons to whom you could well entrust it.

405. You do not think it possible to send the schedules to the farmers for them to fill them up?

I think it would give a great deal more trouble than taking the information from them by the police.

406. Do you think, upon the whole, the information so furnished by the police is reliable and accurate?

I am quite sure they would do their best to make it reliable, and if the parties were aware that it was to be taken to the clerk of the union to be tested according to the known capacity of their farms, they would be more cautious in giving the information, so that it would be more reliable.

407. Do you think it is necessary to extend the inquiry to such small tenements as are included at present, or do you think it would be sufficient for most purposes to obtain the information merely from the large holders. How low would you be disposed to go?

If you sent round the constabulary, I do not see any objection to your keeping it as low as it is now.

408. It descends now to holdings of an acre, does not it?

There is a class below an acre, but that must refer rather to small holdings in towns. In all these matters, in the general valuation, it is possible they may go too low.

409. Lord *Monteagle* of Brandon.] You have been asked about the limitation of the area. Supposing there were a limitation of the area which excluded small tenements, say of one acre or two acres, or any other area, would not that make the returns from one part of Ireland totally inconsistent with the returns from another?

It might do so. We have a great number of very small holdings in the north which still are productive. It is not the extent of the farms which is required, but the number of acres of arable, which makes it a very difficult thing to leave out any holding, however minute.

410. Dealing with the peculiarity of the Irish case, in which so many of the small proprietors grow for the consumption of their own families rather than for sale, would not the exclusion of small tenements diminish the value of the returns to a very great extent, and in some cases to a formidable extent, as supplying any possible inferences with respect to the amount of human food?

I think it would.

411. Earl of *Stradbroke*.] Do you think it would be any advantage to require the sanction or certificate of the guardians as to the correctness of any acreable return?

I know some of the guardians in Ireland think that it would be desirable to have the returns made by the guardians in that way; but my impression is, that if the clerks of unions were paid as the enumerators were proposed to be paid in the Scotch returns, and were made responsible for what they did, the amount of acres under crop would be checked by a person responsible for it, who would look more accurately into it than a guardian might do. I think the assistance of the guardians would be very valuable in ascertaining the quantity of produce, and in asking them for their opinion in that way; I would lay before them the number of acres also. Looking to the mode in which it has been proposed to obtain from them this year their opinion as to the produce of the crops, by dividing the produce into tenths, I am afraid the tenants would not be competent to fill up the paper issued.

412. *Chairman.*] Are you aware of the period of the year at which those returns are made?

They are generally called for in the beginning of July; they are generally taken in June or July. Since there has been this great minuteness, they are very seldom laid before Parliament till the November following.

413. Do you think July is the best period to select for making those returns? I believe it is. *Sir R. A. Ferguson, Bart., M. P.*

414. Is there any other observation which you wish to make to the Committee in regard to the subject of agricultural statistics? 22d June 1855.

I do not see the advantage of printing the agricultural statistics to the great extent to which they are at present printed in electoral divisions. I think summaries by unions, and baronies or counties, would be quite sufficient, particularly if they were given at an earlier period, as they are not issued for more than a year.

Sir Robert Ferguson withdraws.

HARRY BURRARD FARNALL, Esquire, one of the Poor Law Inspectors, is called in, and examined as follows:

415. *Chairman.*] HAVE you been employed for the last year as a collector of agricultural statistics for the county of York under the Poor Law Commission? *H. B. Farnall, Esq.*

Yes.

416. Had you been engaged in a similar occupation in the previous year?

I had not.

417. Generally speaking, the success in the county of York was complete, inasmuch as it appears by your statement that more than 99½ per cent. of the returns were made?

That was the result.

418. Did you find a general disposition, both on the part of the landed proprietors and the occupiers to assist you, and give you all the information you desired?

I did.

419. Did you find a similar disposition on the part of Boards of Guardians to assist you for that purpose?

I obtained some assistance from them.

420. Did you find that any feeling existed unfavourable to Boards of Guardians as being the parties to be employed for obtaining this information?

On explaining to the guardians that this was a mere experiment, I found they very gladly took up the matter; but I was given to understand by some of the guardians, that if it was to be a permanent duty, they thought they should not be the persons employed to proceed with it; they thought their duties as Poor Law Guardians were so defined that they could not take up the matter as a permanent duty.

421. Is it your opinion that there might be any improvement made in the present mode of collecting agricultural statistics?

I think the area of the unions should still be maintained as the basis of all operations, because they are so very accurately defined; and I think you might very easily obtain the services of the clerks of Boards of Guardians (whose time is not altogether to be regarded as belonging to the Board) as classifiers for their own unions, and you might employ the overseers or assistant overseers as enumerators under the classifier. I mention the overseers, because they hold the rate-books, and ought to know the quantity of land each occupier holds within each parish. If the overseers refused, the classifier might be called on to appoint fit and proper persons in each parish to become enumerators. When the enumerators have collected their schedules, they should be taken to the classifier, who should forward them to some central authority, who, I think, might be called the Inspector for Agricultural Statistics, and he should reside in some central county of England, where he could command with the greatest facility all parts of the country.

422. You mean that the returns, when prepared, should be transmitted to him instead of to the Poor Law Commissioners?

Yes, exactly so, and that he should be the person instructed to embody all the

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returns, both as to crops and as to stock, in one Report; and afterwards he might draw up a Report of the estimated yield of all grain crops and root crops in each union.

423. Under him would you employ the officers of the Poor Law Boards, namely, the clerk of the union and the overseer of the poor in each township?

Yes. The overseers have no definite duty to perform under the Poor Law Board; they hold the rate-books, and are answerable for the collection of the poor-rates, but they have nothing to do with the ordinary relief of the poor, excepting in urgent cases, and the clerk's time is only partially employed by the Boards of Guardians.

424. Part of your plan would be, that the clerk of the union should receive the papers from this inspector, whom you propose to be placed in some central position, and that he should transmit them to the overseers of the townships to be filled up by the occupiers of land in those townships?

Yes.

425. Would you not endeavour to obtain some assistance from the guardians? Would you entirely keep them separate from the proposed inquiry?

I see no necessity for the guardians, because the overseers themselves are fully aware of the quantity of land held by each person, the name, the gross rateable value, and the net rateable value, and that is the first information we require.

426. Earl of *Stradbroke.*] Is the overseer generally a man of such respectability that the farmers would willingly give him a full account of what they had grown?

I think he has sufficient respectability to hold such a position as that which I have named; but it must be always remembered that he would derive great assistance from his assistant overseer.

427. *Chairman.*] Do not you think that Boards of Guardians, if disposed to do so, might afford you great assistance in obtaining this information?

They might operate upon their neighbours by persuasion; but the accuracy of the returns could not be tested in any way by the Boards of Guardians without the assistance of the overseers.

428. I see you state in your report, "In most instances both the landlords and tenants rendered effective assistance in the conduct of the inquiry; but I ascribe the satisfactory character of the results principally to the apt and nearly complete machinery which the Boards of Guardians and their officers supplied." How do you reconcile that with the proposition you are now making of discontinuing to avail yourself of the services of the guardians?

I explained to all the Boards of Guardians that it was merely an experiment. I did not give them to understand that for the future they would be called upon to carry out this plan in its entirety. I think they quite understood that they were to try what they could then do as an experiment, and they were perfectly willing to do it upon those terms.

429. Earl of *Stradbroke.*] Do you think they would object to continue their services?

I do not think the guardians themselves would object; I think they would willingly form a committee for the purpose; but the objection would be to their officers being employed, who already have sufficient to do; and I think that giving the relieving officer the appointment of enumerator would sometimes form an excuse to the relieving officer for the neglect of his proper duty, which is to devote all his time to the wants of the poor.

430. Lord *Portman.*] The Committee understood you to say, that the overseers had no duty to perform in connexion with the poor; you would wish to qualify that statement, would not you?

They have no duty with regard to the ordinary relief of the poor; in the absence of the relieving officer they would have the power of giving relief in cases of emergency; but the unions of England will be found to be of such a size, and so easily managed, that it is very rarely the overseer is so called on. Churchwardens and assistant overseers have the same authority.

431. Is not it very constantly the case that a guardian is, in point of fact, the overseer also?
It is; it sometimes happens that a guardian is overseer.

432. As overseer, he holds the rate-book?
He does.

433. Supposing an enumerator is appointed either from among the overseers or some other parochial party who does not happen to be an overseer, and supposing this duty to be made compulsory, would not it be useful to give a power to compel the production of the rate-book?
No doubt of it. There should be a clause in the Act of Parliament obliging the overseers to produce their books to all persons authorized to apply for them.

434. Do you think that, for the purpose of carrying into effect this inquiry, there should be a compulsory power given with a view to enforcing returns being made by the occupiers?
I think there should be a compulsory power, with a fine in the case of those returns not being made by the occupier; and also if they are wilfully incorrectly made, there should be a fine.

435. In case of inaccuracy, would you propose that there should be a fine?
If it was a wilful inaccuracy, and the inaccuracy could be at once tested by the rate-book, as regards occupancy.

436. Earl of *Stradbroke.*] As regards the quantity of land, it could, but not the quantity of corn grown?
It would not show that, certainly.

437. Lord *Berners.*] Would you prefer that the overseers should be employed, rather than the assessors of taxes?
I should in England; my impression is that the tax-gatherer is not a very popular person, and you would not get on so well if the duty rested upon him.

438. Do you think the employment of the assessor of taxes would rather increase than otherwise the jealousy which at present exists among the farmers?
I think it would; I do not look upon him as so popular an officer as the overseer or the assistant overseer.

439. Lord *Portman.*] What difference of feeling is there likely to exist, practically speaking, in the case of a man who collects taxes for the revenue of the country, and a man who collects taxes for the revenue of the parish; the assessor is the one, and the overseer is the other?
It is certainly a point of view which seems rather extraordinary, but still it is the case that a tax-payer will pay more readily to the support of the poor within his own parish than send a sum of money out of that parish to pay for any of the emergencies of the State.

440. Is it not the case that the assessor for taxes is recommended by the parish, and if he fails to pay in the money he has received from the tax-payers, the tax-payers have to pay it over again?
Certainly.

441. *Chairman.*] Is not there an apprehension in the minds of the occupiers in many instances that one purpose of obtaining agricultural statistics is to enable the Government to impose fresh taxation upon them; and is not that feeling likely to be increased, by making the tax-gatherer the person to make those returns?
Yes; and another reason why I think the overseer would be the proper person to appoint is that he and not the assessor holds the rate-book.

442. Is not it the case that farmers are likely to be somewhat jealous of the overseer of the poor holding the rate-book, inasmuch as that is the foundation of all the arrangements as to the county rates, which, under the late Acts of Parliament, are so easily made?
He does hold it by law, and where you have established the law in any parish, the farmers seldom grumble after it has come into operation.

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443. Earl *Burlington.*] Is there usually an assistant overseer in most of the parishes in Yorkshire?
Yes.

444. And the business is generally done, practically speaking, by the assistant overseer?
That is the case.

445. *Chairman.*] Have you considered this subject very attentively, and have you prepared any scheme for carrying the measure into effect in detail?
Yes, I have.

446. Have you that scheme with you?
I have a scheme here, showing the division of labour, and the months in the course of which that labour would have to take place; together with the cost of such labour; the number of officers who should, I think, be appointed, and certain memoranda to be embodied in an Act of Parliament to authorize the same.

The same is read, as follows:

ENGLAND AND WALES.—AGRICULTURAL STATISTICS.

Memorandum for Act of Parliament.

To provide for the appointment of an Inspector of Agricultural Statistics for England and Wales, either under the Poor Law Board or the Board of Trade, with power to appoint and employ clerks (subject to the sanction of the Poor Law Board or the Board of Trade), and to summon such persons as he may see necessary to call before him upon any question or matter connected with the duties of his office; and to make inquiries and enforce answers or returns to such question or matter, and to administer oaths, and examine persons upon oath or declaration, and to require and enforce the production of books, &c. &c.; and (subject to the sanction of the Poor Law Board or the Board of Trade) to order such expenses of witnesses, and the expense of producing books, &c. &c., as he may deem reasonable, upon a fixed scale of allowances.

To provide that persons giving false evidence be deemed guilty of perjury, and refusing to attend, &c. &c. to be guilty of a misdemeanor.

To provide for the appointment, by the Inspector of Agricultural Statistics, of the clerk of each union or incorporation as classifier, at a fixed rate of payment, for each union or incorporation, or for any separate parishes contiguous to such union; and, in the event of any clerk not accepting the office of classifier within seven days from the date at which such office is so offered him, then for the Inspector to appoint a proper person, at the same rate of payment, to perform the duties of classifier to the union or incorporation, or separate parish for which the clerk had not accepted office; and in the event of a classifier dying, or resigning his office, or becoming incapacitated, or disqualified for office, then for the Inspector to appoint his successor. The duties of classifier to be defined.

To provide for the annual payment of three competent persons, at 1*l.* 1*s.* each, one of whom shall be the classifier; to confer with him on the estimated average yield per acre of each crop of grain and roots, such yield to be given in quarters so far as regards grain crops, and in tons as far as regards roots; the classifier to appoint and pay such persons for their services after the rate above fixed upon.

To provide that the classifier shall, on an appointed day, issue to the overseers of the poor of each parish or township within his union or incorporation, or separate parish, a circular letter, offering them the offices of enumerators, at a fixed rate of payment, for the townships in which they act as overseers; and in the event of any overseer not accepting such office within seven days from the date of such offer being made to him, then for the classifier to appoint, at the same rate of payment, a proper person to perform the duty of enumerator for the parish or township in which an overseer of the poor had not accepted the office of enumerator; and, in the event of any enumerator dying or resigning office, or becoming incapacitated or disqualified, then for the classifier to appoint his successor.

The duties of enumerators to be defined.

To provide for the production of rate-books by overseers of the poor to classifiers, enumerators, or other persons duly authorized by the Inspector of Agricultural Statistics, or by a classifier; to examine such books for the purposes of the Act, and to oblige overseers of the poor to insert in the rate-books the total quantity of land occupied by each rate-payer within such parish or township.

To provide that the collection of Agricultural Statistics shall be under the Poor Law Board or the Board of Trade, and that the Poor Law Board or the Board of Trade may make rules and regulations for the collection of Agricultural Statistics, and that either of these Boards may rescind or suspend such rules or alter them.

To provide for rendering it compulsory on the occupier to whom Schedule A. is delivered, to fill it up on a given date either by himself, or by some person authorized by him to fill it up, and for rendering every occupier who shall neglect or refuse to fill up his Schedule A., or who shall refuse to deliver it to the enumerator who calls for it, or who shall wilfully fill up such schedule incorrectly or falsely, subject to a penalty; and for rendering classifiers, enumerators, and other persons duly authorized to collect and distribute Schedule A. liable to a penalty for exhibiting such schedules to any person or persons not duly authorized to examine them; and for rendering all persons liable to a penalty who shall wilfully disobey the provisions of the Act. Penalties not to exceed 5*l.* nor less than 40*s.* Justices to proceed by summons for recovery of penalties. All forfeitures, costs, and charges to be levied by distress and sale, and when so levied to be paid to the classifier of the union where such offence shall have been committed; to be applied in aid of the salaries or payments made to the classifiers and enumerators of such union, incorporation, or township.

Division of Official Duties.

February and March.—The Inspector and clerks engaged in preparing letters to classifiers, enumerators, and overseers of the poor of parishes, and other persons, such letters to comprehend the appointment of, and rate of payments to, the classifiers and enumerators, together with the details of their duties, and also instructions to overseers of parishes to produce their rate-books when duly required, and to forward to the Inspector the number of persons occupying more than two acres of land in each parish, together with the amount of the total rateable value of such parish.

The Inspector and clerks further engaged in obtaining all necessary information for the preparation of the various schedules and other documents, and in taking such steps, either by letter or by journey, as the case may require; to prepare for the perfect issuing of the schedules and the management of the business, and in carrying on the correspondence that would arise out of it.

April.—The whole of the schedules to be issued, together with letters, to the officers appointed in the foregoing months, and the correspondence to be as nearly as possible completed.

May.—Schedules to be circulated by enumerators.

June.—Schedules to be collected by enumerators; each schedule to be dated on the 1st day of June, unless such day should fall on a Sunday, and then on the 2d of June.

July.—Enumerators to incorporate their Schedules A. in auxiliary sheets, and in Schedule B., such schedules to be by them delivered to the classifiers on or before the 31st of July.

August.—Classifiers to incorporate Schedules B. in Schedule C., and Schedule C. to be delivered to Inspector on or before the 1st of September.

The Inspector and, if necessary, his four principal clerks engaged in visiting localities in which difficulties or special circumstances may arise, and in giving such instructions and affording such assistance as the several officers may require to enable them to perform their duties. The other clerks engaged in the preparation of the necessary Forms and Tables of Statistics.

September and October.—Inspector to embody Schedule C. in counties, and to draw up a Report thereon, which will hereafter be a comparative Report for England and Wales, and to be dated the 31st of October; such Report to be printed and published on or before the 30th of November.

November.—The Inspector to be furnished on or before the 1st of this month by the respective classifiers with a Report of the estimated average yield per acre of all grain and root crops in each union and incorporation; the grain crops in quarters, and the root crops in tons; together with the average weekly wages of the agricultural labourer in each union or incorporation, and the population of the union or incorporation, according to the last census.

The Inspector and clerks engaged in filling up the necessary Forms and Tables for this Return; and the Inspector drawing up the Report thereon.

December.—Inspector to draw up Report on the estimated average yield per acre of grain and root crops in the unions and incorporations of England and Wales; such Report, which will hereafter be a comparative Report, to be dated the 31st of December, and to be printed and published on or before the 1st of January.

January.—All necessary steps to be taken to ensure the proceedings of the ensuing year.

H. B. Farnall, Esq.

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ENGLAND AND WALES.—AGRICULTURAL STATISTICS.

The following figures show the probable expense, per annum, of collecting these Statistics in the 52 counties of England and Wales, if placed under the management of Mr. H. B. Farnall.

	£.	s.	d.	£.	s.	d.
Annual salary of the Inspector of Agricultural Statistics - - -				1,000	–	–
His personal expenses - - - - - - - - - -				300	–	–
His railway fares - - - - - - - - - -				200	–	–
Annual salary to 1 chief clerk - - - - -	250	–	–			
Annual salary to 3 first class clerks, at 200*l.* each - -	600	–	–			
Annual salary to 6 second class clerks, at 150*l.* each -	900	–	–			
				1,750	–	–
Personal expenses of 4 clerks, at 160*l.* each per annum -	640	–	–			
Railway fares of 4 clerks, at 200*l.* each per annum -	800	–	–			
				1,440	–	–
Payments to be made to enumerators on 570,137 Schedules A. (the estimated number of schedules for England and Wales), at 2*l.* 15*s.* per hundred - - -	15,679	8	6			
Payments to be made to enumerators on 14,606 Schedules B., at 2*l.* 15*s.* per hundred - - - - -	401	10	–			
				16,080	18	6
Payments to be made to classifiers on 570,137 Schedules A., at 10*s.* per hundred - - - - - -	2,850	13	6			
Payments to be made to classifiers on 14,606 Schedules B., at 10*s.* per hundred - - - - - -	73	–	–			
Payments to be made to 657 classifiers for preparing Schedules C., at 2*l.* 2*s.* each - - - - -	1,379	14	–			
				4,303	7	6
Payments to be made to 3 competent persons in each of the 657 unions and incorporations for ascertaining the average crops, at 3*l.* 3*s.* per union - - - - - - - - - - - - -				2,069	11	–
			£.	27,143	17	–

HARRY BURRARD FARNALL.

447. Earl of *Stradbroke.*] Is there likely to be a great difference in the course of five years as to the amount of any particular crop grown in one district?

I am not aware that there is.

448. Do you not think it would add greatly to the expense and trouble to have two returns, when, as it would appear, one return in October would be sufficient?

I do not think it would add much to the expense, because I propose that the classifier should be authorized to call in two or three land-agents, and that they should confer together, receiving a small fee for such consultation, and that they should then declare the estimated average yield of each crop within their union alone.

449. Do you think the farmers might object to making two returns in the year, whereas they might not object to making only one?

My scheme does not suppose that the farmer would make two returns. The estimated yield I propose should come from the classifier alone, who should consult two or three land-agents or stewards within his union, and so give the average to the inspector for agricultural statistics, without consulting the occupier in any way.

450. *Chairman.*] You would give the average of the union alone?

Of the union alone, upon the aggregate of which the inspector would ascertain, and report the average of England and Wales.

451. Lord *Berners.*] In your report you have given the rateable value of the different unions. Is there much difference between the rateable value to the poor-rate and to the income-tax?

I think there is, but I cannot speak with accuracy upon that point. I believe the poor-rate to be lower.

452. Earl of *Stradbroke.*] Are the Committee to understand that the poor-rate in your district is generally collected upon one system of average?

Upon one system.

453. Therefore no great inequality exists between one parish and another?

I cannot go so far as that. There is a system upon which it is collected in each parish, and that embraces this fact, that they collect upon a less sum than the gross value, from which a deduction is made for repairs, &c. &c.

454. *Chairman.*] Do you think there would be any indisposition to furnish information on this subject on the part of farmers if compulsory powers were given for the purpose, or do you think that the existence of such powers would be an inducement to many to assent to that which the law sanctioned?

I believe a compulsory power would be favourably received. I believe farmers would prefer the information being obtained under compulsory powers to their being asked for it as a voluntary matter, in consequence of their not being quite certain as to what their neighbours will do. If they felt certain that their neighbours were obliged to make the return, they would make one without hesitation.

455. Lord *Monteagle* of Brandon.] Goole and Doncaster are not within your district, are they?

They are not.

456. Are you able to inform the Committee whether there was the same facility given in the Goole and Doncaster unions for making the returns?

I believe in Goole and Doncaster there was; but there was one union called Hemsworth, and there, I think, the guardians objected, and I am afraid my coadjutor was obliged to employ an agent, and to pay him for the performance of the duty.

457. Earl of *Carnarvon.*] What was the extent of acreage held by each occupier from whom you required a return?

I required it from all who occupied more than two acres.

458. Earl of *Burlington.*] Did you make any estimate for the holdings under two acres?

There is a column for the number of acres, but no estimate is made as to what the product might have been of those holdings.

459. Lord *Monteagle* of Brandon.] Do you think, if this system were reduced to practice after it had been in operation for some years, it would become year by year more cheaply carried out, and in a manner to create much less jealousy?

I quite concur in the last remark, that it would create less jealousy, but I do not think you would be able to cut down the expense. As far as my estimate goes, I have put down that which it would be fair and just to pay men for the performance of the duty.

460. If in the infancy of such a system you were obliged to send repeatedly to occupiers to procure information, would not that source of expense be diminished as you proceeded?

Yes; but I propose in this scheme that a man not delivering his schedule to the enumerator when he calls shall be liable to be fined.

461. Lord *Portman.*] Is not your scheme, to some extent, founded upon the system of obtaining returns for making the county rate?

Yes, probably so; and I think my scheme would be acceptable, because there is no great novelty in it.

462. Lord *Monteagle* of Brandon.] Great attention has been paid in Yorkshire to the state of the valuation for county purposes, and there has been a great adjustment of former inequalities, has there not?

Yes, that is the case.

463. All that has tended to give you in the prosecution of this inquiry better data upon which to act?

I think we have had very good data in the West Riding of Yorkshire.

The Witness is directed to withdraw.

WILLIAM DONNELLY, Esquire, is examined as follows:

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464. *Chairman.*] WHAT office do you hold in Ireland?
I hold the office of Registrar-general of Marriages.

465. Is your department concerned in the collection of agricultural statistics?
No. In the year 1851, when the general Census was taken, I was appointed Chief Census Commissioner, and, by the desire of Lord Clarendon, the agricultural statistics of Ireland in that year formed a part of the inquiry; that was the way in which I at first became connected with the collection of agricultural statistics. Those for 1852 were also obtained under the Census Commission; but in 1853 they were placed under my individual superintendence by Lord St. Germans, and have so continued to the present time.

466. Will you state to the Committee the course which was adopted in the first instance for the purpose of obtaining agricultural statistics, and what alteration has been made since that period in the mode of procuring them?
The machinery established by Colonel Larcom in the year 1847 is still employed; the returns are collected through the medium of the constabulary. With regard to some details there is a difference. Previous to 1851 the highest classification of holdings was "above 30 acres;" but, owing to the changes in the size of holdings which have occurred in Ireland, arising from the potato disease, the great decrease in the population, and other causes, the farms of late years have become considerably larger, and it appeared very desirable to ascertain to what extent those changes have taken place; therefore a more extended classification of holdings was adopted in 1851. Previous to that year there were but five classifications of holdings; the classification there terminated at "above 30 acres." In 1851 four higher classes were added. The machinery for collecting the returns remains the same; we have, however, endeavoured to get them ready for presentation to Parliament at an earlier period of the year.

467. Will you state to the Committee what that machinery is, and how it is applied?
I hold in my hand copies of general instructions, and of the various forms with which the constabulary are furnished. I transmit to the sub-inspectors of constabulary, who are 248 in number, a sufficient supply of blank forms, to be filled up by the enumerators for their several districts. The sub-inspectors of constabulary use the Ordnance maps of Ireland, in which the area of each townland is given. The townland lists are prepared by them in duplicate, of which one copy is sent to the office in Dublin. By these lists the sub-inspector allocates to each enumerator a certain number of townlands, having regard to their extent. The enumerator declares at the foot of the returns which he makes that he has visited the townland, and that, to the best of his knowledge and belief, the information so collected by him is correct. I should state to your Lordships that the information given is altogether voluntary; but though it is so, I have reason to believe, from various sources, that of late years much of the objection which originally existed, owing to prejudice and jealousy, has been gradually removed.

468. What means of testing the accuracy of the returns have you?
When the returns are sent to the office in Dublin, we ascertain, by comparison with the Ordnance map, whether the area of each townland is accounted for. With respect to testing the accuracy of the returns themselves, till last year no general attempt was made to do so, but, owing to a correspondence which Sir Robert Ferguson favoured me with, I thought it right, with the sanction of the Irish Government, to call into operation, so far as I could, the aid of the various Boards of Guardians. Accordingly I addressed circulars to them. I now speak not with regard to the area, but the rates of produce. With respect to the area, the Ordnance maps, the local knowledge of the constables, and their personal acquaintance with the occupiers (they being frequently stationed for many years in the same district), and their declaring at the foot of each return that they have obtained the information by visiting the townland, afford proofs of the accuracy of the returns; but they have not been tested in any other way, that I am aware of.

469. Lord *Monteagle* of Brandon.] Have you not been using the word area in two senses, one being the territorial area of the townland itself in occupation, which

which you would test by the official return; and the other the area of the particular land under tillage, respecting which till last year you have had no test at all?

If the occupier made a misrepresentation of that fact, there is no mode of testing the accuracy of the return for his holding.

470. That last observation applies, does not it, to the areas of land under tillage, and not to the area of the townland itself?

Precisely so, to the areas of land under each kind of crop.

471. Does not the official test which you possess, as derived from the survey, although it is not an absolute test of the tillage returns which are afterwards given, containing the area of the tillage, to some extent afford you a means of check?

It does; it affords a check as to whether the enumerator has discharged his duty properly.

472. Will you have the goodness to explain the nature of the alteration which you have adopted in consequence of the suggestions made by Sir Robert Ferguson in that correspondence to which you have alluded?

In consequence of that communication with Sir Robert Ferguson, I thought it very desirable to engage, as far as possible, the co-operation of the several Boards of Guardians, with a view to check the returns as to the rates of produce; and I addressed a circular last October to the guardians, of which the following is a copy:—"To the Chairman and Board of Guardians of the Union. Gentlemen,—The increasing importance attached to the agricultural returns for Ireland, which, since the year 1847, have been collected under the direction of the Government, has made me most desirous to improve those for this year as much as possible. With this object circulars were issued in the month of June last, addressed to the magistracy, clergy of all denominations, and other influential persons in Ireland, requesting them to aid the constabulary, as far as in their power, in procuring accurate returns of the quantity of stock and the extent of cultivation. These returns have now been received; and, from the general good feeling exhibited, and the almost universal readiness with which the required information has been given to the enumerators, I trust that public confidence in the accuracy of these returns will be increased. Another step connected with the inquiries is now in progress, in order to ascertain, as nearly as possible, the average rates of produce in different districts; and on this subject I am desirous to obtain the assistance of the various Boards of Guardians. A supply of printed forms is forwarded to your clerk, which you are requested to be so good as to direct that officer to distribute amongst the guardians of the union, and I shall feel much obliged if one of these forms is filled up and returned to me for each electoral division. Instructions for making out the return are printed on the first page, and a form filled up as an example is given on the fourth; but should further information be required by the guardians, I shall be most happy to afford every explanation in my power. I am, gentlemen, your obedient servant, WILLIAM DONELLY, Registrar-general."

473. The electoral division in Ireland for Poor Law administration corresponds, to a certain degree, with the parochial subdivision in England, does not it?

To a certain degree.

474. It is more equal in point of extent and value?

Yes, I believe so.

475. In consequence of the issue of that circular, did you obtain the cordial assistance and co-operation of the Boards of Guardians generally?

Not so generally as I had hoped; but in consequence of other circulars which I issued, to the number of between 8,000 and 9,000, addressed to the magistracy, clergy of all denominations, and other influential persons in Ireland, I believe the returns of both tillage and stock for last year, owing to the friendly co-operation of the people themselves, were as accurate, and given with as much good-will, as could be reasonably expected.

476. Did you find in the Irish constabulary men of intelligence, and habits of business, and accuracy in filling up official returns, which were satisfactory to you?

I found a degree of intelligence and accuracy which, till I became officially

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acquainted with the subject, I was quite unprepared for. I have brought with me the original returns from several townlands in the counties of Wexford and Tyrone, which will give your Lordships an idea of the satisfactory manner in which the constabulary performed their duty.

477. Are you enabled to inform the Committee whether the result of your experience has been to show that, from the general appreciation of the character and the services of the constabulary in Ireland, and the degree of consideration they receive from the people, great facilities were given to you in the discharge of your functions?

Very great facilities have been afforded to me, and I think the constabulary executed their duty honestly and faithfully. General instructions are sent by me to each enumerator, and I took care, the better to secure their attention to my object, to have these instructions approved of and signed by their inspector-general, Sir D. M'Gregor, and by the Under-Secretary for Ireland, Colonel Larcom.

478. Have you not particular facilities in getting the duty performed by the constabulary, derived from the succession of rank among them, which ensures a perfect responsibility from the head down to the constable actually making the returns?

That is my impression.

479. You stated that the form of the return has varied in consequence of the altered size of the farms in Ireland?

Yes, the classification of holdings has varied.

480. Will you state the new classification of farms which you have introduced; what is the addition which you have made in your new classification to the former classification?

In the inquiries conducted by Colonel Larcom the maximum classification was "above 30 acres," but, owing to the changes which have taken place in Ireland, from the causes already referred to, the enlargement of farms commenced, which has gone on to such an extent that now we use an extended classification of "above 30 and not exceeding 50 acres," "above 50 and not exceeding 100 acres," "above 100 and not exceeding 200 acres," and "above 200 and not exceeding 500 acres," and then comes the present maximum, "above 500 acres."

481. Has not this been accompanied by a somewhat corresponding reduction of the number of small tenements?

Certainly it has.

482. Have both those causes facilitated the obtaining of returns by your department?

I think so; and also it has been greatly aided by the influential support I have received from the public press in Ireland, and from the clergy of all denominations: some of the Roman Catholic clergy informed me, by letter, that they had read the circulars which I addressed to them in the chapel, and exhorted the people to give accurate information to the enumerators. To the clergy of the Presbyterian and Established Churches I am also much indebted; and from a great many landed proprietors and their agents I have received the most friendly and kind co-operation.

483. There was more jealousy, was not there, at the outset?

Yes; an impression prevailed on the part of the people that these inquiries were made for objects of taxation, and that if they made known their circumstances, it would lead to increased taxation. That prejudice I know existed to a considerable extent in some parts of the country. From several Members of your Lordships' House, I beg to say, I also received very great assistance in removing unfavourable prejudices.

484. Did not many jealousies and suspicions exist in relation to the commencement of the Ordnance survey itself?

No doubt of it; that is well known.

485. Have not you heard that on the establishment of the great triangulation for the trigonometrical surveys, the putting the marks on the hills was a matter of suspicion with the peasantry, who doubted whether it was not for the purpose of establishing military posts throughout the country?

I have heard such rumours at the period referred to.

486. There is no such jealousy in Ireland now?
I believe the jealousy is very much diminished with regard to the agricultural statistics.

487. *Chairman.*] At present, do you find any indisposition on the part of occupiers to give you the required information?
I have not been brought into much personal communication with the occupiers, except those in the immediate locality near Dublin, in which I reside; but as far as I can learn from the landed proprietors of the country, their agents, and the constabulary themselves, I believe these prejudices are gradually dying away, and that each year they will diminish, unless some unforeseen difficulties arise.

488. Do you think it would be desirable to possess compulsory powers, so as to force those parties to give you information who at present may hesitate to do so?
So far as I have learned from the sub-inspectors of the constabulary, I do not think that compulsory powers would at present add much to the accuracy of the returns. I think from the good feeling which, with a few exceptions, is now manifested by the people of all ranks and classes on this subject, compulsory powers would not be of much value, though, in the event of such powers being given for Great Britain, it would, I conceive, be judicious to extend them to Ireland, as circumstances may arise to call for their use.

489. Lord *Monteagle* of Brandon.] Do not you think, practically speaking, where those returns are called for through an organized establishment like the constabulary, who are very highly regarded and appreciated by the people at large, though there is not a power of compulsion by law, there is an organization which in fact supplies that, which under other circumstances it might require the law to give you?
It is my impression, for the reasons I have stated, that the returns of tillage and stock are in general willingly and accurately given. In the return there is one column which is filled up with the name of the person who gives the information, and another with that of the landlord, so that we can communicate with them, and receive their explanations on the subject of the return.

490. *Chairman.*] Do you think it is of much importance to carry your inquiries so low as you at present do, or might not you leave out some of the more minute details, and also the produce of small holdings below an acre?
In many parts of Ireland, particularly in the manufacturing districts of Ulster, the holdings are very small. If you were to omit the holdings under one acre, you would, I think, omit some returns which form an important ingredient in the whole result.

491. Are you able to say what per-centage the holdings under one acre bear to the general farms of the country?
I am unable, at present, to state the per-centage, but it varies very much in different parts of the country. In some counties the holdings are much larger than others; while in Ulster, particularly in Armagh and the manufacturing districts of the north, the holdings are generally small.

492. Lord *Monteagle* of Brandon.] Can you state the number of holdings below one acre, as compared with the total number of holdings?
The entire number of holdings in the year 1853 which did not exceed one acre was 35,795.

493. What was the total number of holdings in that year?
The entire number of holdings was 585,349.

494. Will you have the kindness to give the Committee the return in the counties of Meath, and of Armagh, and Roscommon, in like manner?
In Armagh, the holdings in 1853 which did not exceed one acre are 1,132; in Roscommon, the holdings not exceeding one acre are 1,488; and in Meath, in the same year, 1,526.

495. Do you consider that the exclusion of these small holdings, to which you have stated an objection, would diminish very much the labour of the enumerators?
There is no question, if the holdings under five acres were excluded, the inquiries of the police would not be so onerous.

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496. Considering the fact that you obtain your information through an organized body distributed over the whole of the country, do you think that a saving of trouble of that description would counterbalance the loss of accuracy which must ensue from the exclusion of small holdings?

I do not.

497. Would not you lose, practically speaking, if you excluded the small holdings, some of the checks which are now resorted to, namely, those derived from the townland survey?

Certainly we should.

498. Have the constabulary any instructions from you, or do you know whether, without such instructions, they resort to the rate-book and to the valuations as a check on their proceedings?

Not any instructions. And I do not think they often resort to the rate-book for that object; though I have heard of occasional instances.

499. When you have appealed upon questions of valuation to the guardians of the poor for their assistance, have they not possessed the means of checking the returns made by the constabulary by the valuations and the rate-books which are in their possession?

Yes; I think the co-operation of the Boards of Guardians would be very valuable; it was with that view I addressed to them the circular I have read to your Lordships.

500. Does it come within your knowledge that of late years the valuations in Ireland have been made more correctly, and that they furnish now a better check than they formerly would have done on the proceedings of the enumerators?

I think the late revision of the valuation will tend much to the accuracy of such a check on the part of Boards of Guardians; from many of the Boards I did not receive the co-operation I was led to expect. Before I issued to them this circular, I communicated with the late Secretary for Ireland, Sir John Young, and also with Mr. Power, and in consequence a letter was addressed by the Commissioners of Poor Law to every Board of Guardians, requesting their assistance in the matter. I supplied the guardians with the area of the various crops grown in each electoral division, in order to facilitate the returns of the rates of produce.

501. Do the constabulary receive any payment for the work which they perform?

None.

502. Are you aware of the expense of obtaining agricultural statistics in Ireland?

Two thousand three hundred pounds was the entire sum in 1854; the estimate for this year I have taken at 2,300*l.* Each enumerator is allowed 2*s.*, but that is only to defray the expense of the pens, ink, and paper which he uses; and each sub-inspector is allowed 2*s.* 6*d.*

503. *Chairman.*] Can you suggest any improvement in the mode of obtaining this information which is now pursued in Ireland?

I cannot suggest any at present. I think the constabulary do their duty honestly and faithfully, and I am not aware of any body of persons in Ireland who would discharge it so well.

504. Lord *Monteagle* of Brandon.] Is there any agency which could at all ensure to the public that from the north of Ireland to the south the necessary operations should be all carried into effect on the same principle?

I know of no other. In some parts of Ireland it was necessary to employ civilians in the collection of the Census Returns in 1851; and I found that the Returns made through the agency of those persons who were paid for the duty they performed were by no means so accurately or well done as those which I received from the constabulary.

505. Is there not evidence derived from the earlier proceedings under the Census Act to show that any temporary organization for procuring the ordinary Census Returns has failed from the want of continuity and the want of consistency in one part of Ireland as compared with another?

No doubt of it, that such temporary organization comparatively failed.

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506. Looking to the returns of produce, and comparing them with the great alterations which you have described in the size of the farms, is there any connexion between the altered size of the farms, and any altered quantity of agricultural produce and of stock in Ireland?
The stock has very considerably increased of late years.

507. What is the case with respect to the tillage?
Where the drainage has been efficiently and well done, as it has been under the Lands Improvement Acts, and also by many individual proprietors, I think there is no question that a larger yield has been obtained, and also a better system of cultivation pursued.

508. You derive great facilities from the Ordnance maps, do not you?
Very considerable assistance.

509. Have you found them very accurate for the purpose of basing your proceedings on them?
Very accurate indeed. They have been of very great value not only for the purpose of basing our proceedings on them, but also for correcting errors in the townland returns.

The Witness is directed to withdraw.

JOHN PEIRSON, Esquire, is examined as follows:

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510. *Chairman.*] WHERE do you reside?
At Framlingham, in Suffolk.

511. Are you yourself an occupier of land?
Yes; I occupy two of my own farms.

512. Are you acquainted with the course which was pursued last year in collecting the agricultural statistics of the county of Suffolk?
In my own union more particularly.

513. Have you found in your union any indisposition on the part of the farmers to give the necessary information?
There was at first, and the measure required considerable explanation.

514. After the explanation was given, and they were instructed as to the advantages to be derived from it, did they then come in and render their assistance to the persons who were employed for the purpose?
To a great extent. There were two or three of the principal farmers in my union who would not give any information at all. The enumerator reported it to me. I saw these parties, and half an hour's conversation with them put the matter in a favourable position, and they made their returns. I am quite aware of their objections. An increased outlay of capital upon their farms, and perhaps the adoption of many of the more recent improvements in agriculture, had increased their stock during the last ten years to a great extent, and they did not like that to be generally known.

515. You found upon their part an apprehension that if the real state of the circumstances should be made known, advantage would be taken of that knowledge by their landlords?
There is no doubt of it.

516. Did you find that the guardians were of much assistance to you in overcoming those prejudices, and inducing other farmers to make the returns which were required?
When we divided the Board upon it, there was a large majority in favour of giving assistance with respect to agricultural statistics. The moment the majority so decided, the minority determined to assist, and they did so.

517. What was the result at last; did the whole union give you the information required?
Every acre; and on that point I differ with Sir John Walsham. He has made a Report, stating that returns as to two or three thousand acres were not given. I differ from him most decidedly on that point. At page 54 he states the number

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of acres not accounted for, 3,838. If your Lordships will refer back to a few observations of my own, I undertake to say, that every acre was accounted for, and I have the proof-sheet of that before me.

518. Earl of *Stradbroke.*] Did you include the roads and rivers in your return?
Everything.

519. *Chairman.*] Have you any reason to think, from the information which was given you, the schedules that were filled up by the farmers were inaccurate?
They were correctly returned, I have no doubt.

520. Had you any difficulty in obtaining this information, which you think would have been removed if you had had compulsory powers?
If we had had compulsory powers, we should have had no difficulty.

521. Do you think if compulsory powers were given it would create much dissatisfaction on the part of the occupiers?
Not the least.

522. Do you think that that would have the effect in many instances of inducing them to acquiesce in making such returns when they saw that it was legally required of them to do so?
You would then have returns in 12 hours from the whole of the district.

523. Have you found any feeling of this sort, that they did not like to make their returns unless their neighbours made theirs, but that if the whole were equally required, they would have no objection to do so?
Often that observation was made.

524. Were any complaints made to you as to the amount of remuneration which was given to the enumerators, or was it considered to be adequate to the duties performed?
The enumerators in our union would have been perfectly satisfied if the return had been made compulsory instead of voluntary, inasmuch as they had to go in some cases eight or nine times to obtain the return. An increase from 40 *s.* to 50 *s.* would satisfy all the enumerators in our district.

525. Do you consider it important that there should be a compulsory power to enforce the making of the return on the part of the occupier?
I do, decidedly.

526. Do you think it would be desirable to continue to obtain the assistance of the Boards of Guardians for the purpose of getting this information, or is there any other body by which you might obtain it more advantageously?
I should retain the machinery of the Boards of Guardians decidedly. I do not say I would retain the Boards of Guardians, but the machinery of the Boards of Guardians.

527. How would you make use of it?
I would make the clerk the classifier, and the relieving officer the enumerator. In some populous districts in the north of England there may be cases where the relieving officer's duties are more onerous than they are in our country districts, and there I would substitute some other person.

528. Do you think the overseers would be the proper persons to employ for that purpose?
I will undertake to say that the relieving officer is nine times out of ten the more intelligent man of the two.

529. And better calculated for the purpose than the overseer would be?
Undoubtedly.

530. Do you consider that the employment of the officers of a Poor Law Union in collecting this information creates any ill-feeling on the part of the ratepayers towards such officers of the Poor Law Union?
None whatever.

531. Earl of *Stradbroke.*] Is it the fact that the relieving officers in your union have not any very heavy work to perform from the month of July till the end of October?
They have time to spare in those months.

532. Do

532. Do you think there would be any objection to leave a discretion to the Boards of Guardians to determine whether the office of enumerator should be filled by the relieving officer?
I should prefer its being decided by law.

533. *Chairman.*] In your union, at what period of the year would it be most desirable to have the returns made?
The acreage in June or July.

534. How soon can the return of the produce be given?
As early in October as the north of England would allow.

535. Is it your opinion, that making a return of the amount of stock is of much importance to the agriculturists of the country?
I should certainly desire to include that.

536. You think it would not be desirable to exclude that from the returns which were made upon this matter?
I should think not.

537. Lord *Monteagle* of Brandon.] Would you include the green crops?
I should, certainly.

538. Do not the returns of the green crops, if made periodically, give you a check upon the accuracy of the returns of the cereal produce?
No doubt of it.

539. *Chairman.*] Do you think it is necessary that the returns should be annual, or would it be sufficient if they were made at more distant intervals?
In Suffolk, nine-tenths of the district is under four-shift husbandry, and once in five years would be sufficient.

540. You think a quinquennial return would be sufficient for all the purposes you have in view?
As far as the acreage is concerned.

541. Earl of *Stradbroke.*] Do not you think there is a vast difference in the amount of the produce from one year to another?
No doubt of it.

542. Therefore, would not you run the risk, in a quinquennial return, of obtaining an incorrect basis of calculation?
I am for a quinquennial return of the acreage, but an annual return of the produce per acre.

543. *Chairman.*] You think it would be necessary to have an annual return with regard to the produce, and also with regard to the stock?
Decidedly.

544. Lord *Monteagle* of Brandon.] In point of fact, is there any possible way of arriving at the average return of five years, except getting a special return for each of the five years?
Certainly not.

545. If you took it only from five years to five years, would not it be entirely dependent upon the state of the weather or of the harvest in that particular year in which the return was made?
Certainly.

546. Earl of *Burlington.*] Are you aware how the inaccuracy in Sir John Walsham's return, to which you have alluded, has arisen?
We account for that number of acres, though they are not profitable; we have a considerable portion of sea-beach in our district.

547. *Chairman.*] You do not attribute it to any inaccuracy in making out the returns of the cultivated acres?
The inaccuracy does not affect the value of the return as to produce (the column requires a different heading).

548. Is not the making public such information as is contained in these returns of great advantage to the Suffolk farmer?
Decidedly; for example, in looking at this return, I find that the large number of colts shows clearly where the great breeders of horses are.

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549. Have you turned your attention to the subject of the Corn Law averages, and is it your opinion that they are satisfactory, both as a measure of the quantity and also as to price?

They are not satisfactory; in our district the returns are obtained from the shipping port from which the merchants send their corn, and not from the inland markets where the farmers sell their corn. I can mention two or three markets where thousands of coombs of corn are sold every year, and no returns are taken.

550. With regard to the price, do you consider they give you a just estimate of the price of corn in the country?

They do not; a heavy land district, not producing such a good quality of corn, has no corn return made from it whatever, while a light land has been the rule of all our rents in the district.

551. Can you suggest any other mode in which the corn averages might be taken, which would give a more accurate measure of the price?

I should continue the same mode of return, but extend the number of the markets from which the return is obtained.

552. Is it your opinion that it would be desirable to have returns made by the seller of the corn and not by the buyer?

I differ from the gentleman who expressed that opinion; I do not think it would be possible to obtain such information correctly.

553. Why do you think that it would be impossible to make the seller of the corn furnish a return of his sales to the corn inspector?

You would never obtain it from the farmers; their habits of business are not sufficient to lead them to make the return.

554. Earl of *Harrowby*.] In dealing with the buyers you generally deal with a smaller number of men, but men of more considerable habits of business, than when you are dealing wish the sellers?

I am sorry to tell your Lordships that among the small farmers there are many who would not be able to make the returns.

555. Would it be possible to arrive at the just average price of corn by obliging the clerks at the market towns to make the returns themselves?

I do not know from whom the clerk of the market would get his information. I think you would scarcely get the farmer to tell you what he had sold his corn for, or the merchant at what price he had bought it.

556. Is the only mode in which you think it might be improved increasing the number of towns from which the returns are made?

That is the only practicable manner, in my opinion.

557. Should the return be made as it is at present, by requiring the buyers to make a record of their sales?

Yes, by extending that to other market towns.

558. Lord *Berners*.] Do not you think there are a large number of sales which are never registered at all?

No doubt of it; and between market day and market day such transactions take place. I will undertake to say that not one single sale of my own corn has been registered; it has been sold at a market from which no return is made.

559. Supposing such a law were passed, should you feel any difficulty in sending in a return of what you had sold?

I should not myself feel any; but I think you would find that occupiers generally would not make a return of the kind.

560. *Chairman*.] Have you any further observations to make in reference to the course which has been pursued in obtaining agricultural statistics, or have you any suggestion to offer as to any improvement which might be introduced into it?

I think the present system of employing clerks of Boards of Guardians and relieving officers is an admirable system. I do not think the Poor Law Inspectors need be troubled about the matter. If a central office in London were to forward a printed form to the clerk of the union, the requisite number might be given to each relieving officer, who must pass once a week through each parish in his district. He could leave them with the occupiers in the summer season, and they could

could be returned to him at the place of meeting, and there would be no difficulty about the matter. Our people would like it, because the 6*l.* or 8*l.* a year has been found very acceptable to them. There is one observation which I should wish, with your Lordship's permission, to make. I have heard the rate-books alluded to. In our district, I may say, that the rate-books are nine-tenths of them a complete farce. I have taken the trouble to spend one winter in going through the rate-books of the 41 parishes of the union, and out of those I found one-third of them without quantities, or with very inefficient quantities; many of them not added up at all; and in one particular instance a large farm was entirely left out, though the rate had been signed, and partly collected.

561. Lord *Mont Eagle.*] Had the occupier of that farm paid the rate?
No.

562. Earl of *Stradbroke.*] Do not you think the Board of Guardians were a little to blame for that neglect?
No; the amount of levy was paid to us correctly. We had nothing to do with the mode in which that levy was raised.

563. Lord *Berners.*] Do not you think the overseer was to blame?
Yes; no doubt of it, but there was no check upon him. The magistrate's signature is merely a ministerial act.

564. Have you ever been recommended by the Assistant Commissioner to have fresh valuations of the different parishes in your union?
I am not aware of it.

565. Has it been adopted at all?
The valuation made by the Board of Guardians has in five parishes out of 41 been adopted.

566. Earl of *Stradbroke.*] Are not the expenses of the union-house collected upon the amount of rates returned for each parish?
The county rate is paid upon an assessment, which is generally supposed to be taken from the parish rate-book, which is perfectly erroneous. The union levy for the house is paid according to the expenses of the previous quarter or half year.

567. Supposing one parish were assessed at its fair net value, and another parish at only half its value, would not the parish assessed at only half its value have a great benefit as regards the amount it contributed to the support of the house?
No; it would be so with regard to the county rate, but not with regard to the expenses of the house. We, as guardians, do not know anything of the rate-book, nor are we required to know anything about it.

568. Supposing it were necessary to expend a sum of money for the improvement of your union-house, in what way would you collect that rate from each parish?
From the triennial returns made by Sir John Walsham.

569. The triennial returns of the expenditure of each parish?
Yes; Sir John Walsham strikes the rates every three years if demanded, and we have a party of gentlemen who require that every three years the rate shall be struck.

570. Lord *Berners.*] Are those triennial averages struck upon the amount of pauperism, and not the amount of property in each parish?
Certainly, upon the amount of pauperism.

The Witness is directed to withdraw.

Ordered, That this Committee be adjourned to Monday next,
One o'clock.

Die Lunæ, 25° Junii 1855.

LORDS PRESENT:

Earl Doncaster.	Lord Lovel and Holland.
Earl Harrowby.	Lord Mont Eagle.
Earl Stradbroke.	Lord Colchester.
Earl Burlington.	Lord Portman.
Lord Berners.	Lord Stanley of Alderley.

LORD STANLEY OF ALDERLEY in the Chair.

Evidence on the best Mode of obtaining accurate Agricultural Statistics.

W. Torr, Esq.

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WILLIAM TORR, Esquire, is called in, and further examined as follows:

571. *Chairman.*] IS there anything you wish to add to the evidence which you gave on a former day?
Yes.

572. Will you state what it is?
I was asked whether I would wish this measure to be compulsory, and I find I used that word in a stronger sense than I intended. I was afterwards asked whether a penalty should be inflicted. The compulsion which I would employ is this, that a parish should be required to make a return, and in case the parish did not do so, the next authority should have power to appoint a person to undertake the duty.

573. Did you mean that there should be any power to compel an occupier to make a return to the Schedule delivered to him?
Not directly in the shape of a money fine.

574. In what way would you propose to enforce it?
By a report that he had not made the return. Then the inspector of the district, or the magistrates at petty sessions, would send an order to him to do so.

575. Earl of *Stradbroke.*] What would be the use of the order, unless there were a penalty enforcing obedience to it?
That I would leave to others to decide.

576. *Chairman.*] If a parish declined to make the return, you would make it competent to the authorities to send some other person to make the return for them?
Yes.

577. And in the event of the occupier declining to make up his schedule, you would consider it right that there should be an order made by a justice of the peace to compel him to make it?
Yes.

578. Would not that be to all intents and purposes a compulsory mode of obtaining the return?
Certainly it would be. The other matter I wish to explain is this: I find that the meaning of "assessors" is variously understood in my evidence, as to the objection to his being a tax-gatherer. The objectionable person is the surveyor of a district, who is really the tax-collector. The assessor is only the person who sends out the schedules and gets them back again, and has to return his duplicate schedule to the surveyor. Now, it is not the surveyor I would wish

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to have anything to do with, because that would make the scheme very objectionable. I have thought that perhaps once in four or five years collecting the returns would be as valuable for stock as if they were made every year.

579. Do you think that if the return were made once in five years instead of annually, it would be equally advantageous for the purpose of enabling an opinion to be formed of what the crop of the current year was?

It would for stock and cultivated acres, if you did not attempt to make a calculation per acre.

580. Lord *Mont Eagle.*] Do you propose to leave out all calculation as to the crop per acre?

Yes, I think so. I have been a good deal connected with ascertaining the value of crops, and I have been employed to judge of crops with respect to prices, and I have found great difficulty in coming to a correct estimate of the crop before it is cut. I have known crops which have been valued for outgoing tenants by men of the greatest experience, who have been a great way from the truth, when the corn has been thrashed. In addition to that, I would say, that the home consumption of crops has very much increased, owing to the improved management of stock. I would further suggest, whether in the return of the agricultural districts there should be an account taken of the artificial manures expended on the farms.

581. Lord *Lovel* and *Holland.*] You said that you had something to do with a farm in Surrey?

Yes. As far as Surrey is concerned, I said that I had very little knowledge of it, and I did not profess to speak much of it.

582. You have been in the habit, no doubt, of attending farmers' meetings in Surrey?

Not very much.

583. Have you in any part of England ascertained the feelings of the farmers in reference to a compulsory scheme?

I think, generally speaking, the farmers would be against it; but when I speak of compulsory in the sense in which I understand it, I speak of it in this way, that I know without something of that sort there will be increased difficulty in obtaining a return at all. I have no objection, individually, to give the information.

584. Earl of *Stradbroke.*] Do you think the farmers in Lincolnshire, and also in Surrey, are adverse to the plan?

In Lincolnshire they are.

585. *Chairman.*] Do you think the farmers in Lincolnshire do not consider that it is of great importance to their interests to obtain accurate agricultural statistics?

Generally speaking, I should say they do not.

586. Generally speaking, you would think that they were indifferent to the subject?

Yes, I think so.

587. Do you, yourself, think that it is of great importance?

I think that it would certainly tend to useful results.

588. Lord *Colchester.*] Do you mean to say that the farmers in Lincolnshire, generally, do not see any advantage in obtaining the returns, or that they think the advantage is not so great as the disadvantage to themselves individually in giving their own return?

I should say it would be somewhat an unpopular measure with them; they would not think the advantage so great as the disadvantage of the inquisitorial portion of it.

589. Lord *Berners.*] Do you not think that the measure would tend to prevent a panic or such fluctuations as we had last September?

I have no doubt, if the statistics could be arrived at, it would be an advantage, and would assist in preventing anything of that kind. I do not think you will

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will be able to obtain the acreage quantity with any certainty to rely upon safely.

590. Admitting that to be the case, would it be a satisfactory mode of proceeding to take the average of a certain district, and afterwards to report year by year whether the crop was above or below that average?
I stated on Friday that I thought the least objectionable manner of approaching the Lincolnshire farmer would be to require him to say whether he considered the crop above or below a certain average. I think you would generally get that stated very truly.

The Witness is directed to withdraw.

JAMES BUCKLAND, Esquire, is called in, and examined as follows:

J. Buckland, Esq.

591. *Chairman.*] HAVE you been practically engaged in agriculture?
I have.

592. Have you also turned your attention to the subject of agricultural statistics?
I have.

593. Do you consider that it is of great importance to the country generally, and to the agriculturists themselves, to obtain accurate statistics of that kind?
Of the utmost importance to the country, and to agriculturists too.

594. What do you think are the main advantages of it?
The main advantages will probably appear by pointing out the disadvantages of the absence of agricultural statistics. With regard to the country generally, it is quite clear we are in a position at the present moment in which we cannot depend upon foreign supplies with any certainty. We have always, without such information, been in a situation in which the agriculturist has been at the mercy of the importer, and the Government has been totally ignorant of the wants of the country, and of the consumption and the growth of the country; and it has been left entirely to speculative persons, who have continually derived their own benefit from the disadvantage of the agriculturist. That the farmer himself should possess a knowledge of agricultural statistics I think will appear very evident, and many of them now are much more strongly convinced of that than they were 25 or 30 years ago, because by the returns being published at a period which would enable them to decide upon the cultivation of their crops for the ensuing spring, by viewing the number of acres under any particular crop during the season which has passed, they may regulate their future cropping very much, and to that extent in the spring cropping there would be a material advantage derived by farmers. The farmer at present is also very much at the mercy of false representations as to the crops of the country; they may be false from accidental errors, because the facts are not really known, or they may be false from wilful misrepresentation. Certain individuals may derive a benefit from representing them to be more, and others from representing them to be less than they really are, and yet in the very cases of those individuals, the utmost ignorance must prevail; I believe the country has been in a complete state of ignorance, and that we have been often misled, sometimes intentionally, and at other times unintentionally.

595. Do you think the estimates and calculations of produce which have hitherto been before the public have been generally an accurate representation of the real produce of the country?
I do not.

596. Can you state any reasons which induce you to think they have been very fallacious and inaccurate?
I think the estimates of produce have been exceedingly fallacious, and very much over-estimated, and I believe the consumption of the country has been likewise over-estimated. I particularly refer to the wheat consumption of the country, and more especially to the wheat growth of the country. I have some

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knowledge of most of the counties of England and of Ireland, and from previous practical knowledge, I have considered those estimates to be very highly drawn indeed, both as to the consumption and as to the growth. My own decided impression is that the growth of wheat in the last seven or eight years has been materially diminished, in consequence of the repeal of the Corn Laws as one cause. Your Lordships are probably well aware, that it was only 30 years ago that turnip husbandry came into partial use, and of course it was a considerable period before the less enlightened of the tenantry were induced to adopt the system. As they saw other people deriving great benefit from it, however, they gladly fell into it, and it has now become so general that green crops are much more abundant than they were 25 years ago; and much more of the tillage land is appropriated to crops of that description. In consequence of the repeal of the Corn Laws, there is no doubt a large majority of the tenantry felt exceedingly disposed to lay down those lands which were in a fit state for it in grass, and wheat being one of the items most expensive to cultivate, and requiring perhaps a higher remuneration than any other, I think there is still a great inducement to grow other cereals than wheat, the farmer knowing also that wheat is generally deemed to be a very exhausting crop to the land. I think the combination of those circumstances has led to a very diminished growth of wheat, and with it to an improved system of agriculture, by its diminished growth; I mean, a reduced area in the growth of wheat; for while the improvements in agriculture have materially contributed to increase the acreage result, so that while the acreage produce of wheat may have been taken 15 years ago at 22 bushels an acre on an average of seasons, by an increase of green crops, and our improved system of cultivation, and the resting of the land from so frequently cropping with wheat, I believe the average will be found to have increased to about 28 or 29 bushels. I am not now referring to the last year, when your Lordships are aware the average excess was very considerable indeed. I think, generally, there has been an average increase in the last 15 or 20 years of about 30 per cent.

597. When you state that the effect of the repeal of the Corn Laws has been to reduce the cultivation of wheat in this country, do you mean that that has arisen from an apprehension of the price not being remunerative?

Yes, I believe that that apprehension is now lessened.

598. Has the price of wheat in the last two years been above or below the average price in the few years previous to the repeal of the Corn Laws?

It has been better.

599. Earl of *Stradbroke.*] Is that in consequence of the war, do you think?

I think not. I apprehend it is in consequence of this fact: ten years ago farmers were in the habit, when they had any surplus capital, of investing that surplus capital in their stacks of wheat. They felt a certain degree of pride in possessing a considerable quantity of old wheat. But I believe, since the repeal of the Corn Laws, we have been gradually encroaching upon that feeling, and also encroaching upon the accumulations of old stock; and therefore, in the year 1853, when we had a very bad crop, it followed that, in fact, there had been a gradual exhaustion of the former old stock going on as a matter of process for six or seven years before, till it was all gone. The farmer, subsequently to the repeal of the Corn Laws, was unwilling to lock up his capital in that way, and the result was, that we were then brought to the very nearest possible verge of famine; and unless Providence had blessed us with such a season as the last, I do not know what the consequence would have been.

600. Do you think the decrease of stock was owing to the impoverished condition of the farmers?

No; I think it has arisen from the apprehension that wheat was not an advantageous stock to hold over for another year; whereas they had the idea some years ago that they could always dispose of their old wheat well. In grinding new wheat it is necessary, for the first three or four months, that there should be an admixture of old wheat, or of wheat grown in a hotter climate than our own. Upon the repeal of the Corn Laws it became evident to the farmer that there would be no difficulty in obtaining wheat harvested in a hotter

hotter clime than our own, which was adapted to take the place of his own home-grown old wheat.

601. Lord *Berners.*] In 1851 and 1852, when the price of wheat was reduced to about 40 *s.* a quarter, did it come to your knowledge that a crop of mangold-wurzel was of much greater value than wheat?

I am quite aware it must have been so; I am not aware of any specific fact, but I am sure that that must have been the case.

602. And other green crops the same?

Relatively the same.

603. The increased value of the green crop and the price of meat were a part of the inducements to grow less wheat?

I have no question about it.

604. *Chairman.*] Is it your opinion that the English agriculturist is at present at a disadvantage with the foreign agriculturist, in this respect, that the agricultural statistics of England are very inferior to those of most foreign countries?

I believe that he labours under very great disadvantages from the absence of agricultural statistics, but I am not so sure that in that disadvantage he should be compared with the foreign agriculturist; he labours under this serious disadvantage, that the foreign merchant who is acquainted with the foreign statistics of agriculture has generally the means of becoming to a certain extent acquainted with as much as some of our own principal merchants know of our own statistics, which is very little, and perhaps that little very frequently very erroneous. The British agriculturist suffers from this, that the foreigner is in the market imperceptibly, because buying through agents it is impossible to know who the purchaser is. Thus, the foreigner is frequently in the market imperceptibly to the agriculturist, buying his wheats and removing them to his own market, and then when the farmer is awakened to the position in which he stands, and in which the country stands, the country is actually in a position that it is obliged to buy back again that wheat, or some substitute for it, from the foreigner. That which we should have kept at home, and which the farmer would have kept at home if his statistics had been such as he could have placed confidence in, he has parted with.

605. Earl of *Stradbroke.*] If the corn had not gone out of the country, perhaps a rise would not have taken place in the price to the same extent?

There would have been a rise, but the rise would not have been so sudden, or so violent; that which the tenant farmer suffers from is the violent fluctuations which take place: sudden alarms are created by individuals who are interested, or by the facts which may have come to his knowledge that the foreigner has been in the market buying up his corn; he then withholds his corn, and expects a large price for it; the consequence is, that it runs up to a price which no thrashing can keep pace with. On the other hand, if it be the case that the known imports which are on their way are exceedingly heavy, the farmer, in order to anticipate them, rushes into the market with his corn, and throws down the price to so low an ebb that the foreign corn lies on hand for a time, and the speculator gets the benefit ultimately.

606. *Chairman.*] To what produce would you be disposed to limit the investigation for the purpose of obtaining information as to agricultural statistics?

I think it would be exceedingly desirable that the inquiry should be so limited as not to excite even the suspicion of the farmer. I am quite aware that he has no ground for such suspicion; but my being aware of it, or your Lordships being aware of it, does not remove it. That suspicion exists to a great extent; and I think the inquiry should be so limited at first as that it should not create any unnecessary alarm in the mind of the occupier or the tenant, and if the inquiry were limited to the cereals which are produced, and to potatoes which constitute the great supplies of human food, and the food for our stock, and which are the subjects of import, that would be quite sufficient for the purposes of the country, as far as regards bread-stuffs. On the other hand, I think the inquiry with regard to live stock may be properly limited to two descriptions of each stock, and those two may be animals which are preparing to be slaughtered,

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and animals which are intended to be kept as storers, whether cattle, sheep, or swine, and whatever their ages may be at the season of the year at which the enumerations are made; but the time which I have suggested, viz., the 31st of August, would be a period when there are no lambs preparing for slaughter, and no calves, or scarcely any, or no pigs; no young, in fact, of any stock; those which were preparing for slaughter would be those which were fattening stock, and actually making ready for the butcher.

607. Do you think it of importance that there should be more than one return, that is to say, a return at more than one period of the year?
No, I think there should be only one.

608. Which you would have made on the 31st of August?
I would.

609. Would a return on the 31st of August enable you to obtain an estimate of the produce of the current year?
I believe it would enable you to obtain as near an estimate as it is possible to secure; you would then be at a period at which some portion of the corn would have been reaped, but that would be more especially the period at which the farmer can, without any difficulty, form a very general and correct estimate of what his produce is likely to be; if it has not yet been reaped, it will have approached very nearly to maturity, and the farmer will be able to approach nearer to an estimate of what the probable produce will be than at any other time. Then I propose, supposing this return to be made on the 31st of August, that in the month of March there should be a report in general terms to the Board of Trade, probably by some officer in each union, as to whether the average of the district or union had exceeded that which was expected, or whether it had fallen short of it.

610. Earl of *Stradbroke.*] In your great experience has not it often happened that an estimate of the crop taken at the end of August has been found to be very fallacious in the month of October?
That has been the case, but I believe it has arisen in a great measure from the fault of the estimates. Supposing that the statement were made a month before the harvest, it would frequently happen that the farmer would be exceedingly erroneous in his calculation, because subsequently mildew may ensue; we may have very stormy weather; the corn may be beaten down just when it is at maturity, and a large quantity may possibly be shed, and so a large portion of the crop may be lost. Two or three days before cutting it, I think the farmer can tell what the yield will be.

611. *Chairman.*] If you take the estimate on the 31st of August, would not you necessarily leave out a very important ingredient in your estimate, namely, the condition in which the grain should be harvested?
By the 31st of August nearly the whole of the corn in England is cut, or within a day or two of being cut.

612. In stating that the 31st of August is the proper time for making the returns, you proceed upon the supposition that the harvest would be nearly completed at that time?
Not completed, but that it would be commenced; and I believe the harvest would be so near to maturity that there would be very little risk after that of any blight, or mildew, or anything of that kind affecting it, which the farmer cannot foresee as existing at the time. Another reason for naming the 31st of August is this: your Lordships will be aware that on the 30th and 31st of August there are no fixed cattle fairs of any description in the kingdoms, with the exception of two or three in Ireland on the 30th of August; and in enumerating the stock, unless a day be fixed upon on which the whole of the stock shall be taken, there will be stock moving and travelling to fairs and markets, some sold, and some unsold; and unless also the day be the same throughout the country, the same stock would be in danger of being twice returned, or of being omitted.

613. Earl of *Stradbroke.*] You appear to be of opinion that it would be of great importance to obtain an accurate account of the cattle likely to be killed for food within the coming year?

In

In a state of fattening at the time.

614. Do you think you would be as likely to get a correct account of that on the 31st of August as on the 28th of October?

I think so; taking those which are destined to be fattened, every farmer knows on the 31st of August whether he means any portion of his stock to be slaughtered in the next three or four months. If the stock should not be purchased till after that day, they would most likely be purchased as storers.

615. As storers to be sold out before the month of February?

I think not; after that to be sold out before the month of February.

616. Do not the majority of the farmers in Norfolk and Suffolk purchase after that date, and sell in the course of the winter and the coming spring?

They buy them half fat; they buy them in a high condition; and the individual who sells them has been feeding them for the express purpose of selling them to the Norfolk stall-feeding farmer for the purpose of slaughter; and they would come into his return as beasts being prepared for market, with a view to fit them for the butcher.

617. Do not a great quantity come to Norwich Hill in July and August, which are sold in the London market in the following April?

No doubt of it.

618. *Chairman.*] Do you consider that the course which has been pursued of resorting to the assistance of the Poor Law Commissioners, has been the best course which could be adopted for the purpose of obtaining accurate agricultural statistics?

I do not.

619. Is there any other plan which you have considered, which you think would be more conducive to the object we have in view?

I think the prejudices of the farmers must be, in the first instance at all events, met. The farmers certainly have a very strong feeling that any information which passes through the channel which they suppose comes before the *ex officio* guardians, who may be their landlords, or comes before their landlords' solicitor or agent, and before the different relieving officers, and others who may make the matter the subject of village gossip as to what the returns may have been; and under those circumstances, though the Poor Law machinery is a very efficient one, and exceedingly well adapted for the purpose of a medium of communication between the Board of Trade and the farmers themselves, they being in the possession, generally speaking, of all the farmers' names, as ratepayers and their occupations, still I think the farmer should return the schedules in a sealed form, and not so as to be subject to the inspection of the Boards of Guardians, or any of their officials.

620. Whom should they be returned to?

I would suggest the desirability of dividing the United Kingdom into 17 districts, each of which should comprise about 4,000,000 acres, and I think one Commissioner or Inspector would be quite sufficient for the purposes of bringing together the whole of the detail, with the assistance probably of five or six writing clerks, and in six weeks or two months he would be able to get together, and to present to the Board of Trade, the entire results of his divisions. The Board of Trade would then be in a position to present the whole gross results to the public, and at some future time a more complete detail may possibly be afforded from the information which the Commissioners may have received.

621. Would you propose that the Inspectors should transmit to each occupier a paper containing the schedule he is to fill up?

I think that had the labours of the guardians and the Poor Law officials been confined to the mere duty of supplying the agriculturists with schedules, and receiving them again, and sending them back to the Commissioner, or some individual appointed to receive them in a sealed state, and not subject to inspection, a very large portion of the difficulty would have been removed; in fact, it never would have existed at all; therefore the proposal I would submit would be that the clerks of each of the unions should in the first place be supplied by the Commissioner or Inspector of the district with the necessary instructions to communicate with the overseers of the poor and the relieving officers,

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and that they should furnish each one of the relieving officers or overseers in the union with a sufficient number of schedules for every occupier in that union; that the relieving officer or overseer should then deliver to each occupier one of those schedules, to be filled up by the occupier himself by a given day, or if the occupier declined it, then to be returned, the occupier stating he declined filling it up; that when so filled up, it should be sealed; that the occupation, as well as the name of the occupier, should be indorsed upon the sealed schedule, so that the clerk of the union may be at all times able to identify the return of every individual occupier with the schedule which he has kept, and the forms which have been sent out; but in the cases of recusant occupiers, who would generally be found to be very small occupiers as to area (because the more intelligent and enlightened farmers, I believe, would not object to make returns freely and voluntarily), having given notice to the clerk of the union that they objected to fill up the return, I propose that these schedules should be immediately handed over to the guardians of the union, and that the guardians should then appoint some person duly qualified, with the assistance of the overseers, to supply this return in the best way he possibly could, who would be, of course, a paid officer; but in all those cases, the schedules or forms of the occupiers so filled up by the surveyor, or the person appointed, should be open, and subject to the inspection of the guardians, and that for two or three reasons: one would be, that the tenantry who were unwilling that their returns should be investigated by the guardians would be desirous to make their own returns, which would be sealed, and so pass them immediately to the Commissioner, who would probably be residing in the centre of the district, a total stranger to all the parties, a stranger to their landlords, and to their occupations, knowing nothing about A, B, C or D, but only having those figures he required before him. If he understood the subject thoroughly, as I think he ought to do, he would, by casting his eye over those schedules, be able to detect any egregious or palpable error which may appear to amount to a misrepresentation, and would have it in his power to make such inquiries through the medium of the officers as should lead to a proper investigation of anything like a false return. At the same time the farmers, knowing he was sufficiently acquainted with the subject for this purpose, would be more cautious than they otherwise would be to make their returns as accurately as possible. The unwilling occupiers having the returns made for them by the surveyor, which would be open to the inspection of the guardians and of the officers, would, I have no doubt, be diminished in number the following year to a very great extent. There would be far greater willingness on their parts afterwards to make the returns themselves than there would be in the first instance, in consequence of their being desirous that they should not be so exposed to the inspection of the officers of the unions, and of their more immediate neighbours. The Poor Law Inspectors' reports already exhibit, with all the unwillingness of the occupiers to become parties to the employment of the machinery as it has hitherto been employed, something more than four-fifths of the occupiers who have made their own returns voluntarily; and in Scotland, where no such objection has existed, I believe something less than one-tenth of one per cent. constituted the sum total of the defaulters. It appears to me that if the returns have been so made from four-fifths or five-sixths of the occupiers under the existing objections to the recent experiments or late circumstances, if something like the plan I have suggested were adopted, there would be a much greater proportion next year, because the grounds of opposition manifested by the remaining one-fourth or one-fifth is that which would be completely obviated by the course which I have now suggested, with regard to the secrecy and inviolability which would be so given to the tenants' information: and under these circumstances, it would, I believe, be the case, that after two or three years, those less intelligent tenants, feeling that no injurious consequences had resulted from the disclosures which had been made by the larger tenants, who are their own immediate neighbours, and that the result had been that the agricultural interest was benefited by the information so obtained, would be found perfectly ready to drop by degrees into the plan; so that in the course of a very few years there would be no recusant occupiers; there would be an interest felt in obtaining the knowledge by which others had been benefited; they would feel it to be very much for their advantage to possess the information, and the larger occupiers would induce the smaller occupiers to acquiesce in the system

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at as early a period as possible. It would be almost impossible in the commencement of a large system, such as this must be, and one which in its nature has necessarily been very repulsive to the feelings of the agricultural interest, that any plan could be adopted which could be expected in the first year or two to prove completely successful. There must be some time given for it to work; and then, I have no doubt, those who are not now convinced by the arguments of their neighbours will be convinced by the lapse of time, and will feel that it is quite an innocuous system.

622. *Chairman.*] How do you propose to test the accuracy of the returns which are not voluntarily made by the occupiers, consistently with the inviolable secrecy which you consider so essential a point?

There would be no means of testing the accuracy of those returns; but I believe the accuracy of those returns, when left to the honour and fidelity of the parties, would be very much greater than you could possibly obtain by means of any party who might be appointed to inspect or to value the crops. I believe so for this reason: that the grower himself is at all times the most competent person to form an opinion about what his produce is likely to be. That being the case, I think your Lordships may feel, even supposing some few instances to occur in which a man may make a fraudulent return (I do not know what his inducement to do so would be), but supposing the returns to be either too much or too little, the instances in which occupiers will return too much will prove an equipoise to those in which they will return too little.

623. Earl of *Harrowby.*] Are not careless returns likely to be made?

Yes; I think you have no means of protecting yourself against them.

624. Is not there a certain class of farmers who will think it rather an extra trouble to go over the whole of their crops beforehand, and to make an estimate of them for the purpose of filling up this return?

I have never known a farmer in the whole of my experience, who was worthy of the name of a farmer, who did not visit his crop, and every field of his farm, at least once a week; and, as he approached nearer the time of harvest, he would visit every field almost daily. Every farmer has, in fact, valued his crop long before it comes to the sickle; he values the crop again and again up to the last day; he does that when it is in sheaf, and when it is in the stack.

625. Earl of *Stradbroke.*] Are there not some farmers so ignorant that they are incapable of forming a correct opinion of the value of their crops?

I think there are some, but I think they would be generally conscious of their own ignorance; and I would provide that they should be at any time at liberty to request their neighbours to value their produce for them, and that, on their neighbours giving an opinion as to the amount of their produce, the schedule should be filled up by them, the party himself signing it.

626. Earl of *Harrowby.*] What is the inducement to a man to call in his neighbour to give accuracy to a return in which he thinks he has no interest?

His interest would be to make a return for the public good; and in the mode in which I put it, if he did not make his return, or his neighbour for him, under seal, then it would come under the eye of the surveyor appointed by the guardians, and come as an open document to the guardians.

627. What would be the inducement to a man not to give a careless return, or for the purpose of avoiding giving a careless return, to call in his neighbour to give accuracy to it?

There is no protection against that; and I do not see any possibility of providing protection against it. Your Lordships will have seen from the report of Mr. Maxwell, that in Scotland nothing of that kind was apprehended there. Even your surveyor may make a very careless estimate. There are many difficulties in the way, no doubt, and exact accuracy is not to be obtained. I consider that probably too much was grasped at in the late effort; it was too much subdivided; too much was presented to the farmer's attention. There was a division into roods and other fractional parts of an acre, which it is impossible that any one can estimate. What I suggest is, that the Commissioner of each district should be a man practically acquainted with the subject, and a man who, when a return comes before him, should be able to see, with a very hasty glance, whether there were any glaring improbabilities in the return, and

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investigate such cases. Suppose a certain number of acres were represented to produce an amount which came to 50 or 60 bushels per acre, if he were a practical man, he would have that investigated immediately; or, if it were the case that, in proportion to the arable land, it were seen that the farmer had a much larger proportion of wheat land than is customary, that would be a subject to be investigated.

628. Lord *Portman.*] The great principle of your proposal is that the return should be under seal, is it not?
It is.

629. You have probably attended a good deal to the Scotch system?
I have investigated the reports.

630. Is it your endeavour to get as near that system as the circumstances of England would permit?
It is.

631. You say that the guardians, with the aid of the overseers, should appoint some other persons to make the returns of the recusants; why do you put upon the guardians and overseers that particular part of the duty?
I rather think that the fact would be this, that the guardians have an opportunity of knowing the individuals who are the most competent, and the most likely to be acceptable in their own immediate neighbourhood to the tenantry generally, and that they, being locally connected with the parties, would be the fittest persons to name an individual to supply the hiatus which would be caused by a recusant occupier.

632. How do you propose to pay the expenses of making those returns?
By paying the surveyor according to the acreage. That will form part of the general expenses of the system.

633. Might the expense be made to fall upon the recusant?
I should be glad that it should fall upon the recusant.

634. Are you familiar with the mode of collecting returns for the purposes of making the county rate under the present statute?
I am not.

635. Do you happen to be aware that in the case of recusancy, in reference to the county rate, the party refusing has to pay the expenses?
I was not aware of that.

636. Are you aware whether there has been a new county rate in the county of Gloucester within the last 20 years?
I am not.

637. Do you know the habits of the farmers of Gloucestershire better than those of the inhabitants of any other county?
No, not better. I am acquainted more particularly with the habits of the farmers in Wiltshire, Somersetshire, Berkshire, Oxfordshire, and Buckinghamshire.

638. Supposing it to be said, that in any return which was made by the farmers themselves in the various counties, it would be desirable to have something like a scale of addition, in order to arrive at an approximation to accuracy in the returns, do you think any such per-centage would be desirable, or might the returns, as a whole, be relied upon?
I think you might rely upon them as a whole.

639. Lord *Berners.*] Supposing the system were once adopted, and a day were appointed for the delivery of the return, would not it become a matter of interesting conversation among all the occupiers in the parish, and would not they consult one another, supposing they did not feel quite competent to make the return themselves?
I have no question of it. I should wish to place myself in the position of a tenant occupier. If I entertained any doubt as to the prospective crop, I should not hesitate a moment in consulting with my friends and neighbours as to the produce.

640. There is no question that the large occupiers would do so; but would the smaller occupiers do so, in your opinion?

I think it is very probable. With respect to small occupiers, though they may form one-fifth of the whole number, the area held by them may not be one-twentieth of the whole. I imagine the principal recusants are occupiers of under 50 acres, and we have upwards of 300,000 occupiers in England, exceeding an average of 100 acres.

641. Would you limit the return below five acres?

As far as England is concerned, it may be desirable to do so at present, though, I believe, your Lordships will find that returns might be obtained with ease as low as two acres.

642. Earl of *Stradbroke.*] As it appears probable that a more correct return of the grain grown could be arrived at in the month of October than on the 31st of August, do you think the advantages of having such a return on the 31st of August are sufficient to counterbalance that manifest disadvantage?

Yes, I think so; and I imagine a great benefit to the country would be lost if the return were made on the 31st of October instead of the 31st of August. The compilation of the returns would require so long a period afterwards that it would be impracticable to get them fairly before the public so soon as the 1st of December. I believe in the mode I have suggested they may, as to wheat, be got before the public before the 1st of November.

643. *Chairman.*] You mean that the returns made up to the 31st of August might be laid before the public by the 1st of November?

Yes; I think the gross return of each district might be so; at least, I think it might be done with ease as to wheat.

644. Earl of *Stradbroke.*] The Committee understand you to say, that in your opinion the willingness of the farmers to give correct returns will greatly increase as the system proceeds?

I have no question of it.

645. Therefore, in drawing a comparison between the returns from Scotland and from England, probably the fact of the system having been more recently introduced into England may be one reason why the returns are not so correct as they are from Scotland?

I do not think so. I think the reason arises from the machinery applied in obtaining those returns not being so good; in fact, being more likely to defeat than facilitate them.

646. Lord *Portman.*] Your opinion is, upon the whole, that these returns would be likely to be tolerably accurate?

I think so.

647. Are you acquainted with the process of valuing farms for in-coming and out-going tenants, when the in-coming tenant takes the standing crop?

I am acquainted with the process, to some extent.

648. Are you well acquainted with the results?

I have been so.

649. Have you found those results tolerably satisfactory?

I have found them satisfactory where the parties have been able to have access to the grower of the corn. I may mention one particular instance which occurred within my own knowledge lately, in which a valuation took place between the out-going and the in-coming tenant; one of the valuators had access to the grower of the crop, the other had not; he was valuing for the opposite party; it was a field of 30 acres of wheat to which they were both taken; they were taken to one side of the field, and there was a decided appearance of uniformity over the whole field as regards the straw and the appearance of the crop, and the valuation was made upon an inspection of that portion of it; but it turned out that one part of the field had been sown about a fortnight before the other, and that that part which had been sown during the first fortnight had yielded about 15 bushels per acre more than that which had been sown a fortnight later, and that arising from the fact, that bad weather intervened and injured the seeding time, and the crops had never recovered it afterwards, though

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in appearance the bulk of the straw was precisely the same. I should say, therefore, when access can be had to the grower, or to the state in which the seed was first committed to the ground, and its appearance in its various stages afterwards, the valuations may be very accurate upon the growing crops; but without that access the risk of incorrectness is very much increased.

650. Therefore, unless all the facts are brought before the valuer, the party who is to make the scrutiny over the property of the recusant would not be likely to give an accurate return?

I do not think he would.

651. *Chairman.*] Are the Committee to collect that, in your opinion, the fear of exposure on the part of those occupiers who declined to make up their schedules would be enough to enable you to obtain your purpose without having recourse to compulsory powers?

I believe it will be sufficient to secure the object to a greater extent than it has been secured at present. The first experiment in Hampshire was a far more successful one than the second. In Scotland, on the other hand, in the few counties in which it was tried, the recusants were, in the first instance, five per cent.; but last year, throughout the whole of Scotland, the recusants were only about one-tenth of one per cent.

652. Do you think it would be just to attribute the increased number of instances in which the information was not given by the people of Hampshire to their indisposition to make returns, while their neighbours did not make them?

I think that may have had a little influence. It is quite certain every individual would feel that unless the returns were universal and general for all national purposes they cannot be very available; but that the system will grow into a general and universal system, provided there be no objection to the mode in which it is worked, I have no question. With respect to the compulsory power which has been referred to, I apprehend myself that any such power would be almost worse than inoperative. It is not for me to say whether your Lordships' House, and the other House, would grant such a power in the first instance, but I imagine if such a power existed, it would create strong and painful conflicts between landlords and tenants, and between constituents and their representatives; and I believe that there are conscientious and intelligent farmers who would really prefer paying the penalty to making the returns, and giving the information which was to be exposed in the mode in which the information lately has been exposed. On the other hand, those who were unscrupulous, and would be ready to make false returns, would make such rather than incur the penalty; and the result would be, that the returns would be defective from those who were likely to be honest, and abound from those who were likely to be dishonest. I think, also, there would be a strong feeling that the individuals who had been fined had been sacrificed.

653. Lord *Portman.*] Supposing the compulsory power be not in the shape of a penalty, but that the compulsion assumes the same form as that which now exists under the County Rate Laws, do you imagine there would be any more resistance to a compulsion for the purposes of those returns than is now made to the County Rate Act, which imposes a compulsion of its own kind?

Yes, I think so. The information in the one case will be of far greater importance than in the other: the farmer does not look upon the return in question as being for the purpose of information; the farmer looks upon it, if not as being possibly for purposes of taxation, yet that it may be used to his prejudice by the landlord; that it may lead to a distress for rent, or to an advance of rent.

654. *Chairman.*] Have you turned your attention to the question of the corn averages, and the mode in which they are now taken?

I believe they are exceedingly fallacious.

655. Do you think they are fallacious both in reference to price and to quantity?

More with regard to quantity than price: they are fallacious as regards price, because only the best corn is generally returned; the inferior corn is not generally returned; and when I speak to a certain extent of my own knowledge, I happen, as your Lordships may know, to be in the immediate neighbourhood,

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in Gloucester, of some of the principal importers of foreign corn in this country out of London, and I believe it is the general opinion of the farmers that those averages, as they are now obtained, do not represent the actual sales or purchases which take place, because the same corn is frequently sold and re-sold over and over again with a rising market, and the returns are repeated in the same way, not that I would attach any blame to the returning officer, because the returns are made by parties interested in giving him the information as to the quantity sold.

656. Can you suggest any mode by which you think we could more readily obtain an accurate average of the price of grain sold in this country?

I have not turned my attention to that subject; but I think your Lordships will find that there would be a much easier mode than that, of ascertaining the quantity of wheat which is actually sold and consumed in the country, and that would be by a return from all the millers in the kingdom, probably once in three years of the quantity of corn which they ground.

657. Earl of *Stradbroke.*] Do you think the millers generally keep an accurate account of the quantity they grind?

Yes, I think they do; my observation will be understood to apply only to wheat.

658. Is not it the fact that in many parts of England there are numerous people who send very small quantities to the millers to be ground, and do you think that the miller keeps an account of all those small quantities?

If he be a man of business, I should suppose he does so.

659. *Chairman.*] That would only be a return of the quantity, of course?

Nothing more than that, of course.

660. Would it be also a just return of the quantity of corn produced in this country, seeing that in many large mills in this country foreign corn is ground to a great extent?

I think there would be no difficulty in that: having your imports of corn in an unground state, by deducting them, and ascertaining the difference at the close of the year, you would ascertain what quantity had been ground at home.

661. Lord *Portman.*] Are you of opinion that the bulk of the millers of England keep any account of the wheat which they are paid for grinding, by means of toll?

I should think they do; I am not sufficiently acquainted with the millers to know what the fact is.

662. Earl of *Stradbroke.*] With the improved machinery which is being introduced from year to year, do not you think there will be a great quantity of corn ground at home which will never come to the millers at all?

I do not think there is much now.

663. Lord *Berners.*] Have you considered whether there could be any mode adopted of taking the quantity of corn sold from the seller?

I have not attended to that point particularly.

664. *Chairman.*] Even though you were able to obtain such information from the millers as might give you an estimate of the amount of corn consumed in this country, that would not enable you to ascertain the price; is there any mode which you have considered by which that could be ascertained?

I have not considered that point; I apprehend that there would be considerable difficulty in it.

665. You are not prepared to suggest any plan for that purpose other than that which is now in operation?

I am not.

The Witness is directed to withdraw.

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WILLIAM RODWELL, Esquire, is called in, and examined as follows:

666. *Chairman.*] ARE you practically engaged in agriculture?
I farm upwards of 500 acres of land in Suffolk.

667. Have you turned your attention to the subject of agricultural statistics, and the course which has been pursued in procuring returns during the last year?
I have.

668. Is it your opinion that the course which has been pursued is the one best calculated to obtain the information required, or is there any other mode which you can suggest which you think preferable?
I think that the mode which was adopted was not the mode best calculated to secure the making of accurate returns. There are various objections to that mode of obtaining them which I have found in practice; I think that a better scheme for obtaining those returns might be adopted; but I do not think any scheme will be effectual unless it is rendered obligatory upon the occupier to make a return.

669. In what mode would you render it obligatory upon him; would you enforce it by a penalty, or by what means would you compel him to furnish the information required?
I should make it compulsory upon him by some pecuniary penalty; if he refused to make the return which was required for the purposes of public policy, I think he should be subject to be summoned before a magistrate for the purpose of its being enforced. I think no universal return can be obtained, except you adopt some means of making it obligatory upon the occupier of the land.

670. Provided such powers were given, do you still think it would be expedient to make use of the machinery of the Poor Law officers for the purpose of obtaining the information?
I think the Poor Law officers might be partially employed; that is to say, the clerks of the unions might be the persons who should receive the returns. The Board of Guardians might be the parties who should elect proper parties to obtain those returns; such persons might be appointed either for individual unions, or for adjacent unions at no great cost, as would be thoroughly acquainted with agricultural pursuits, who would be competent to make the returns, and who would be unobjectionable to the farmers, and who would be good judges at the same time of the probable accuracy of such returns; I refer to the employment of paid agents, who are accustomed to the ordinary duties of agricultural valuers.

671. Do you think there should be a paid agent in every union employed by the guardians for the purpose of distributing the papers, and obtaining the information desired?
I do not say for the purpose of distributing the papers, but for the purpose of collecting the returns from each occupier throughout the parishes. I think the present mode of distributing the papers is perfectly unobjectionable; that is to say, it is convenient that the clerk of the union should distribute those papers by means of the relieving officer, who goes into every parish, and has an opportunity of doing it; but I do not think that the relieving officer is a fit person to employ in obtaining those returns from the occupiers, independently of the fact being, that in nine cases out of ten the relieving officers are fully occupied in the discharge of their ordinary functions, and have no time for the performance of such duties as these.

672. Did not you say that the papers should be distributed by the relieving officers?
The papers might be distributed by the relieving officers.

673. What duties would you assign to the paid officers whom you propose to appoint; if the relieving officer distributed the schedules, why should not he again receive them from the occupier when filled up?
I think the paid officer would exercise a control to a certain extent, by going to

to the parishes and receiving those returns. The paid officer having the power to compel the production of the parish map and the parish rate-book, he would then compare the returns made by the individual occupiers, either with the tithe map or with the rates, and ascertain by that means the accuracy of the quantities returned, so as to correspond with the total in the maps; and with the knowledge of agriculture which I assume he would possess, he would be more likely to receive an accurate return than any other person; and added to that, he would be enabled to give other information not provided for in the return, which might be of service, and which might be appended to the returns in the shape of observation.

674. What remuneration would you propose to give to this paid officer so employed?

I cannot say, except that it should be such a remuneration as would be fairly adequate to the discharge of the duty. It must be dependent to some extent upon the acreage, but it should be of such an amount as to impose upon him responsibility, and make it worth his while to take pains to be accurate in the returns which he so made.

675. Are the Committee to understand that the plan you would recommend would be this: still to preserve the machinery of the Poor Law Unions, but instead of employing the relieving officer for the purpose of collecting the information, you would employ a paid officer, appointed expressly for that purpose; at the same time you would require that there should be compulsory power to enforce a return from every one to whom a paper was issued?

That is my plan.

676. Lord *Berners.*] Would you see any objection to the employment of either the overseers or the churchwardens of the parish for the purpose of delivering those returns, inasmuch as they are conversant with the acreage, which every man holds from the poor-rate book?

There would be no objection to that, but I think it would be more convenient that the relieving officer should distribute them.

677. Lord *Portman.*] Supposing the relieving officer, for various reasons connected with the administration of the Poor Law, should be objected to, do you see any objection to the assessor of taxes being the person to deliver out the returns?

None whatever; the assessor in most agricultural parishes is generally the person who is employed where a paid officer in a parish is employed; he is a person who combines the offices of assessor and collector of poor's rates, and does in fact all the parish business; he would be a very fit person to distribute the papers to the occupiers.

678. Earl of *Stradbroke.*] Does not the assistant overseer collect the rates?

He is the assistant overseer; he generally combines the office of assistant overseer and collector with that of assessor. He knows more of the individual occupations and the comparative value of the land than almost any person in the parish: I am speaking of my own district.

679. Generally speaking, you think he is a man who has the confidence of the inhabitants of the parish?

Their entire confidence.

680. Earl of *Stradbroke.*] Is the assistant overseer often elected, either because the overseer is incompetent, or because the occupiers generally think it better to have a paid overseer than to take turns themselves in the performance of that duty?

They do it to get rid of the trouble themselves; they would rather pay a small sum to a man who will take upon himself all the offices of assessor, assistant overseer, and collector of the rates.

681. You object to the relieving officer being much concerned in this duty; do you think the relieving officers in your district are fully occupied between the month of July and the month of October?

I think they are entirely occupied; the time of the relieving officer is occu-

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pied in going through the different parishes, and in the distribution of the relief to the poor.

682. What is the union in which you reside?
The union of Samford.

683. Do the principal gentry in your union take much pains to persuade the farmers of the advantages of giving correct returns?
The disposition of the gentry undoubtedly was to make the returns as required, but I think they felt persuaded that it was impossible to overcome the scruples which the farmers entertained, from various reasons; I believe the principal reason, as far as my own observation went, was this, that while one man was quite willing to make the return, he found his neighbour unwilling to do so. They feel that they ought all to make the returns; but if all will not do so, it seems to be rather invidious to make the distinction, and you will get no returns upon which you can fairly rely.

684. Have the principal gentry taken much pains to overcome that prejudice?
At the Board of Guardians great pains were taken to urge it upon the farmers. Those who are elected as guardians are not always farmers, nor the most intelligent, or the largest occupiers in the parish. I believe they were convinced in most instances of the policy of having such returns, but the enumerators confessed their total inability to persuade their neighbours to make them.

685. *Chairman.*] The Committee are to understand that the chief ground of the objection of the farmers to make the returns was, that they were not universally made, and that if they were bound legally to make them, the greatest part of that indisposition on the part of the remaining farmers would be removed?
Entirely. I think there was another objection which prevailed to a great extent, which arose from the form in which the requisition was made. It would be, in my opinion, a great benefit if the requisition were not so circumstantial as it is, and if several items which are in the form of the return were omitted in future. The whole of the return which related to the live stock was considered by the enumerators as being very difficult to arrive at, and it was that which added very much indeed to the objections which the farmers had to make any return at all.

686. Earl of *Stradbroke.*] Do you think any farmer would have a serious difficulty in giving a correct return of the stock in his occupation?
Many. The practical difficulty would be this: a great many farmers really do not know the amount of stock they possess on a given day.

687. Earl of *Harrowby.*] Do you mean that they do not know the number?
Many of the largest occupiers do not. The number on their farms is daily undergoing a change.

688. *Chairman.*] Does not every farmer know the number of his flock?
Very few of the largest flock masters know it accurately at all times.

689. Earl of *Stradbroke.*] Supposing the system which was pursued last year were to be continued for another year, do you think the difficulty of obtaining a correct return would increase or diminish?
I think those who then objected would be confirmed in their objections.

690. Have you any farmers' club in your union?
We have not.

691. Lord *Berners.*] If you consider these returns to enter too much into detail, would you simplify them by putting barley and oats together, and turnips and mangoldwurzel and carrots and potatoes together?
I would enumerate the articles in this way: wheat, barley, oats, rye, beans, peas, potatoes, hops, cultivated fallow, naked fallow, clover, or other artificial grass seeds, clover seeds, permanent pasture or marsh, down and sheep-walks, wood and plantation.

692. Earl of *Stradbroke.*] What would be the object of making a return of woods and plantations?

Merely

Merely that the amount might correspond with the total amount of acres in the tithe maps of the parish.

693. Do not the tithe maps represent that already?
The amount of plantation has undergone since the tithe maps great alterations.

694. Earl of *Harrowby.*] You do not think that much objection exists in the minds of tenant farmers upon the ground of the returns showing up the condition of their farms?
Those would be very minute exceptions to the general rule. I believe the farmers, generally, would be quite willing to make the return.

695. Lord *Portman.*] Have you considered at all the question how you would proceed to sift those returns after you had them?
I think if those returns were collected by a paid agent in the manner I have suggested, and they were sent to the clerks of the unions in the manner which was prescribed on the last occasion, and the process were then gone through, as accurate a report would be obtained as possible.

696. Do you think that the individual returns would be sufficiently trustworthy not to require any person or any body of persons to test them?
I think by the means I have suggested they would be so; but by no other means do I think they would be.

The Witness is directed to withdraw.

Mr. SAMUEL SANDARS is called in, and examined as follows:

697. *Chairman.*] HAVE you turned your attention much to the subject of agricultural statistics?
I have for some years.

698. Did not you in a former year prepare a plan for the purpose of obtaining them?
I did.

699. Will you state to the Committee what the scheme was which in your opinion is best calculated for that purpose?
To appoint an intelligent agriculturist as Inspector for each county, holding not less than 50 acres in his own occupation, with a salary of 60*l.* to 100*l.* a year, varying with the extent of the returns. In Hertfordshire there are 135 parishes, and according to Sparkman's Statistic Analysis, the farmers are 1,900, and the collation of that number of returns by the Inspector would not occupy more than 10 or 12 days; and the whole of the returns might be submitted to the Board of Trade in the month of November; and as there would be only 52 counties (some of the largest of which it might be desirable to divide), the whole of the actual returns from the County Inspectors might amount to 60 or 65; and the Board of Trade would be enabled to arrive at the combined amount of the returns within a few hours' labour on receiving them from the Inspectors. The mode of obtaining the returns should be through the medium of the Collector of Assessed Taxes, who is a fixed officer, and in the habit of sending schedules to each occupier: any portion of such returns may be returned to the collector, sealed and addressed to the County Inspector. This would avoid any unpleasantness on the part of the farmer to an objectionable surveillance of his business by his neighbours, and there would be then little inducement to make unfair returns. To confine the returns to farmers and occupiers of land not holding less than five acres of arable land, or 10 of pasture. The collector of the returns to be paid 1*s.* for each schedule, to be paid him by the overseers of the poor of the parish, on the certificate of the Inspector. All parties refusing or neglecting to make such returns shall be summoned for penalties, on the instructions of the Inspector to that effect, and all fines paid to the overseers of the parish. The Inspector, for the more certainty of obtaining the returns by a given day, shall despatch an agent into each hundred of the county, to collect them from the

Mr. S. Sandars.

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returning officers. Each collector of the returns shall send to the Inspector a list of the names liable to make returns in the parish, and then to have the required number of schedules forwarded to him: the Inspector would enter the names in his books, and ascertain who were defaulters; and he would then have the lists in readiness to fill up on the receipts of the returns. The object of making the returns so late as in October is to have a clear and correct estimate of the results of the different crops after their maturity; for all crops, particularly wheat, are liable to great injury in quality and quantity from bad harvest weather, and the effects of mildew and blight when it is near maturity, for which no allowance could be made by any returns made in July or August; and the yield of the different crops would be to some extent ascertained by the quantities thrashed out previous to the 21st of October to be sent to market, and for seed. The expense of obtaining the whole of the returns to the Government, if the collectors are paid by the parish authorities (which in many instances would not exceed a few shillings, and in the largest parishes 3*l.* to 4*l.*), would be some 10,000*l.* to 12,000*l.* In my schedule I have suggested that the returns should be delivered by the collector of assessed taxes. "The return must be filled up (and may be sealed, if desired, addressed to the County Inspector, with the name of the occupier on the outside of the schedule), within 14 days after the 21st of October; that is, on or before the 8th of November next, under a penalty of 40*s.*"

700. What means do you propose to test the accuracy of the returns so made to your Inspectors?

I do not think there is any means of doing it without an undue exposure to the local authorities, and I should trust to the general accuracy of the returns as a whole.

701. If the scheme you suggest were carried into effect, you would rely entirely upon the good faith of the occupiers in filling up the returns so sent to them?

I am of opinion that that would be sufficient.

702. Since you proposed that plan, the machinery of the Poor Law Commissioners has been employed for the purpose of endeavouring to obtain agricultural statistics; has your opinion been altered by seeing the operation of that experiment?

My opinion is, that it is not a desirable means to make use of. The Poor Law officials are not generally in very good odour among the agriculturists; they are not much liked by the agriculturists, the Boards of Guardians particularly.

703. Earl of *Stradbroke.*] Do you think that that is the case generally, or do you apply the observation to particular parts of the country?

I think it is so generally.

704. Earl of *Harrowby.*] You mean that the machinery of the Poor Laws is not a very popular machinery?

I should say not.

705. Earl of *Stradbroke.*] In what part of England should you describe that as being most the case?

I will not undertake to say that.

706. Earl of *Harrowby.*] You think the farmers would be unwilling to furnish the desired information through that channel?

I think they would; they do not like the inspection of their returns by the Board of Guardians.

707. *Chairman.*] Do you think it of great importance to agriculturists, as well as to the country at large, that accurate agricultural statistics should be obtained?

I think it of very great importance.

708. Can you state shortly the reasons which you think make it of so much importance?

I think you might arrive at the general results of the harvest after a certain quantity is thrashed out, and that it would give the number of acres under different

ferent kinds of cultivation; particularly, it would give the quantity of wheat grown, and it is very desirable that it should be known whether that is increasing or falling off. *Mr. S. Sandars.* 25th June 1855.

709. Do you think the estimates and calculations which have hitherto been made have been extremely fallacious and inaccurate?
They have been very wide of the truth. With your Lordships' permission, I will make one observation respecting the corn averages. I have been accustomed for a great number of years to see the returns, and I am convinced that they are very laxly collected; I know in my parish of Hemel Hempstead, which is the largest market in the county of Herts, the returns have not shown one-fourth of the actual sales for the last two years. I have made complaints to the Corn Inspectors, but they have not been attended to.

The Witness is directed to withdraw.

JOHN CURTIS, Esquire, is called in, and examined as follows:

710. *Chairman.*] I BELIEVE you have been largely engaged in farming? *J. Curtis, Esq.*
I have.

711. In what county?
In West Norfolk.

712. Are you now engaged in agriculture?
No.

713. Have you considered the question of agricultural statistics?
I have.

714. Do you think it is of great importance to the agriculturists that they should obtain accurate information upon this subject?
Yes, and to the public generally. I believe I was one of the first persons, if not the first, to call public attention to agricultural statistics.

715. Do you think the present estimates and calculations on this subject have been very inaccurate?
They have.

716. Have you been practically acquainted with the course which has been pursued during the last year through the medium of the present Poor Law Commissioners in obtaining these returns, and do you think any better means could be adopted for securing them?
I think a better mode might be adopted. This inquiry, particularly as to the quantity of wheat produced in the country, it strikes me is of immediate importance. The month of July is the usual time when all large corn merchants and persons interested in the corn trade send their agents into the corn-growing districts of England, to see what is about the average growth about that time. Did they know what had been the average amount previously, they would be able to tell by an inspection of the growing crop whether they were above the average or below it. By that means, they would be enabled to judge what orders they should send to foreign countries to purchase corn for the supply of the country the following year.

717. How would you arrive at that knowledge?
By sending circulars to the churchwardens and overseers of each parish in order to ascertain the amount of arable land contained in that parish, and what proportion of that is annually sown with wheat. At the same time, if a circular were sent to each union, a great portion of the guardians being connected with the land, you might ascertain very nearly what was the average produce of wheat in each union; and I think that that would be a means of giving, as nearly as it could be ascertained, the amount grown throughout England and Wales. I would ask the different guardians to form their individual estimates; they could the next Board-day consult together, and say what is the average produce of their union. I think there are very few farmers who do not know

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that fact as regards their own immediate neighbourhood. There would be nothing of an inquisitorial character attached to this plan; and I think every union would give a very satisfactory return of the average produce of the wheat grown in the district.

718. Lord *Portman.*] Do you mean per acre?
Per acre.

719. Earl of *Stradbroke.*] They would state generally whether they considered it to be the average, or above or below the average?
Yes; but the most important part would be to ascertain what is the average, whether two quarters, or two and a half quarters, or three quarters, or any other given quantity, with the number of acres annually sown with wheat. As soon as they had ascertained whether the growing crop was likely to come up to the average or to fall below it, the corn merchants would then be able to send their orders to foreign countries accordingly. I think you would not then see that variation in the price of corn which we do now; but foreign corn would be brought into the market whenever it would realise a handsome profit to the speculator.

720. Do you think that would be sufficient, without taking a more accurate return after harvest?
After harvest, further steps might be taken; but that appears to me to be the most important thing, the quantity of wheat which is grown.

721. In what month would you propose to make the inquiry?
The present would be a good time; it might be taken at any time; but the month of July is the best time to judge of the growing crop, just before the time of harvest.

722. Do not you think you would get a much more accurate statement in the month of October?
You would obtain then a more accurate idea, from some portion of the crop having been thrashed. You must then ask the growers, or you must have persons to go about to form an opinion of the corn in stack.

723. Do not you think, generally, the farmers have thrashed out some small quantity at that time of the year, so as to enable them to form an accurate opinion of their own produce?
Some do; particularly small farmers. When I was a farmer, I used to drill all my corn at nine inches. I used at the beginning of harvest to take a man round each field, and cut out about 11 yards square in three or four different places, just as I supposed the land varied, or the corn varied. Then, having done that at my leisure, I used to take this wheat home and thrash it. Directly it was thrashed out, I knew to a nicety what corn I grew upon my whole farm.

724. At what period did you do that?
At the beginning of the harvest.

725. Though you did that successfully, is it not a very uncommon system with the great body of the farmers?
I have not been much acquainted with farming for the last 10 or 12 years; but I should think the advance of the age has done much for the improvement of their ideas.

726. Lord *Portman.*] Were you engaged in farming in the year 1846?
No.

727. You are not aware of the doubts there were in that year as to the quantity of corn in this country?
No, I do not remember that.

728. Earl of *Burlington.*] Do you propose that the Boards of Guardians should determine what the average produce usually is?
I think you would obtain a conscientious return from a Board of Guardians: after they had ascertained what had been the average for the last three years, or any given period, in the month of July they could tell you what was the state of the crop which was then growing.

729. Lord

729. Lord *Portman.*] Do you think there is that amount of concord among the members of a Board of Guardians that they would be likely to agree as to the answer to be returned to such a question?

I think a simple question like that, not touching upon their own private affairs, as individuals they would be willing to answer.

730. Is not the Board of Guardians generally composed of landlords and tenants?

Yes.

731. A large proportion of the difficulty in carrying out any system of this kind has been found to arise from the jealousy which exists between such parties; if that be the case, would not it be probable that a body of tenantry, with their landlords in the room, would be less likely to give an accurate return?

I should hope not; I think, if the tenant is a good farmer, one of the greatest pleasures he can have is to let his landlord know that he is so.

732. The assumption is that the tenants oppose the making of these statistical returns, because they do not wish that the Government, on account of taxation, or the landlords, on account of rent, should know accurately the amount of corn they are growing. Would not the Board of Guardians be less likely to obtain accurate returns than some other body with which that element of jealousy would not be associated?

I do not think they would have any objection to give a return of the average quantity of corn grown in the district; but I think the questions which I have looked over are of a character which would excite a great deal of suspicion; and many of the farmers would not like to give an answer to the various queries, which they would think might expose their position, as farmers, where they would not wish to have it known.

733. Supposing the bulk of the evidence taken before this Committee tends to favour the Scotch system, under which it is impossible that the tax-imposer, or the landlord, should know any of the details, are the Committee to understand your opinion to be that this is not a correct system; but that the more open system of the Board of Guardians is the advisable one to be followed?

I think so.

The Witness is directed to withdraw.

Ordered, That this Committee be adjourned to Thursday next, One o'clock.

Die Jovis, 28° Junii 1855.

LORDS PRESENT:

Earl Doncaster.	Lord Lovel and Holland.
Earl Carnarvon.	Lord Mont Eagle.
Earl Harrowby.	Lord Colchester.
Earl Stradbroke.	Lord Portman.
Earl Burlington.	Lord Stanley of Alderley.
Lord Berners.	

LORD STANLEY OF ALDERLEY in the Chair.

Evidence on the best Mode of obtaining accurate Agricultural Statistics.

Wm. Miles, Esq. M. P.

28th June 1855.

WILLIAM MILES, Esquire, a Member of the House of Commons, is called in, and examined as follows:

734. *Chairman.*] HAVE you turned your attention to the mode in which the attempt to take agricultural statistics has been carried out during the last year?

I have.

735. Is it your opinion that it is most expedient to attempt to obtain the returns through the intervention of the Poor Law Commissioners, or do you think that some other mode might be pursued with advantage?

I think the system which was pursued was wrong; and I think it was wrong on these grounds: first of all, you endeavoured to do it through the intervention of Boards of Guardians. The Boards of Guardians in the country being generally composed of tenant farmers, many of whom are entirely hostile to your plan, and consequently would not give you that assistance in their different parishes which you required, I think it would have been very much better if you had endeavoured to have done it through the assistance of the overseers, or the several officers appointed under the Poor Law for collecting the poor-rates. I propose their employment upon this ground, that they are obliged to make a demand upon every one in every parish for the poor-rate; and supposing there are four rates in the year, of course they make four demands. By looking at their rate-books, they have the acreage occupied by every man, and, therefore, they have the power of at once checking any false return. Now such a power neither have the guardians of the poor nor the relieving officers, and it is impossible that any fallacy in the return should be checked officially until it comes back to the clerk of the union; when it comes back to the clerk of the union, he has in his possession documents which will, of course, enable him to check the accounts as they come in; but then it is too late, because everything has been done, and he merely sends, as I understand, the list which he obtains from the respective parishes in the union, in a tabular form, directly up to the Board of Trade; therefore there is no effective check whatever as to the returns given in by the respective occupiers of the land. I besides think that it is ridiculous to attempt to get agricultural statistics voluntarily, because it has been my good fortune to have addressed farmers in various parts of the country, and the subject of agricultural statistics has very often come under discussion; though I have found amongst the higher class of farmers, and those even of small holdings, that there has been no objection whatever evinced to what they call a fair showing of their holdings, yet, when you come to require particular details, they have the greatest objection to give them.

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them. In the last Report upon Agricultural Statistics there is a statement, and I think nothing can be clearer, with respect to the difficulties which arose in Wiltshire. This statement is in the words of practical farmers, and I do not think I can give better evidence than by pointing out their opinions: first of all, as to the objections; and next, their view that if any good system of agricultural statistics is to be adopted, a compulsory law should be enacted to obtain them.

736. Will you be good enough to read the passage to which you refer?

At page 9 of the Report relative to the Devizes Union there is this passage: "The committee appointed by the Board of Guardians of the Devizes Union to collect statistical returns of agriculture, regarding the present inquiry as merely preliminary, desire to enter their protest against any inquiries respecting agricultural stock and produce, as unjust and injurious to the cultivators of the land, unless conducted in such a manner as to prevent the exposure of their private affairs." From the Marlborough Union the clerk writes: "The committee have no doubt, that if the several occupiers could have been assured that the returns of individuals would have been destroyed here when the aggregate of the parishes should have been made up, nearly the whole would have been completed by the occupiers themselves." Then I wish to direct the attention of the Committee to the last paragraph, which gives the feelings of a meeting of the Agricultural Statistical Committee of the Union: they state, "A very strong feeling existed amongst many of the most influential farmers then present, against making the return of the several occupations. Many of them say they have no objection to have a private meeting (at which the enumerators might attend) in their respective parishes, and make a joint return of the whole of the parish in one schedule, or for three or more persons to make their return in a joint schedule." I may state that in Wiltshire, generally speaking, the holdings are large, and the farmers are of the most respectable class, and I think they are men who would assist the Government as much as they possibly could in getting any information really required, so that no endeavour was made to pry into their particular affairs. I observe there is a statement made in the Report of the utter impracticability of getting any return which would be satisfactory voluntarily; that statement is in page 7, and with it I quite agree.

737. Do you concur in opinion with the Inspector that it is absolutely necessary to have compulsory powers for the purpose of obtaining any statistics which may be satisfactory?

Quite so; to different Boards of Trade I have mentioned, when my opinion has been required, for the last 14 or 15 years, that I do not think there would be the slightest objection (so that you only ask what they are willing to give) to rendering the power compulsory.

738. To what extent would you propose to require information?

I would take the table which shows what you have required previously, and I would state what I think you may require, and would get.

739. In the plan which you propose, do you contemplate sending round schedules to each occupier to be filled up by him, returned to the overseer, and then to be transmitted to the clerk of the union, or in what way would you obtain the information?

I think the best thing would be that the Board of Trade should send to the overseer of each parish a certain number of returns: in the term "overseer," I, of course, include the collectors of the poor-rates, who are appointed in certain parishes. I mean, of course, that the collectors of poor-rates, where they are appointed, should do the same duties as the overseers of the poor; therefore I would say the returns should be sent to the overseers of the poor and the collectors of the poor-rate, and they will have no difficulty whatever in presenting at any time when they call for the poor-rates this return, together with their demand for the poor-rate. My own opinion is, that unless you have these returns at a particular part of the year, they will be perfectly useless, and therefore I should recommend them to be delivered, say in April, to the occupiers, and be collected together in June. Between May and June, I think, an estimate may be formed tolerably well of the crops; you must not, however, ask the farmers for an estimate; all you must ask from them is, a return of the different cultivations

vations under which their farms are placed, viz., so many acres of wheat, so many acres of barley, so many acres of beans and peas, turnips, artificial grasses, natural grasses, and things of that kind. In obtaining that, there cannot be the least difficulty; but if you ask the average which they expect their occupations to yield, they will at once kick at it. First of all, they will say, "It is impossible to form any estimate which may be relied upon; and next, we object not only that the public should know the produce of our farms, but likewise that our landlords should know it."

740. Should you be inclined to recommend that the information required should only be to that extent, namely, the quantity of acres under cultivation, and the different crops with which they are prepared?

Certainly, as a preliminary Bill; I think afterwards, in all probability, when the farmers' minds were perfectly settled, that there would be very little difficulty in getting the stock; but at present there is a difficulty, because they will say, "Bless my soul; this will lay open to our landlords immediately whether we have sufficient stock or too little stock on our holdings; it would show the landlord what the length of our purse is, and on that account, in all probability, we shall not be so well treated as we should be if our landlords were perfectly ignorant of the fact of the quantity of stock which we possess."

741. Is it your opinion that it is a matter of considerable importance to have an accurate return of the stock in the country?

No doubt; but I would not hamper the first Bill with anything that I thought would be very objectionable to the tenant farmers.

742. It is your opinion, that to make a return of the amount of stock in every case would be felt to be objectionable on the part of many farmers?

It would be by those who are not in good circumstances; there is no doubt of it. The higher description of farmers would not have the least objection to make such a return; but there are throughout the country a great many men who hold middling or second-rate occupations, and it is upon those men that a pressure would be placed, which they would not like at the time.

743. Would you have the papers which you propose to be filled up sent directly from a central Board or authority in London to the overseers, or would you have them sent through the intervention of the clerk of the union; because I think you stated in a previous part of your evidence you contemplated that the overseers should transmit those returns, when filled up, to the clerk of the union?

Afterwards; it is merely to save the trouble of the officer. I think that the transmission of forms will be just as safe by being sent by post from the department to the overseers as by first of all going to the union clerk to be afterwards by him distributed to the different overseers.

744. You do not contemplate that the clerk of the union should exercise any functions but those of a purely ministerial character, to transmit the returns to the central authority, wherever it might be?

Quite so.

745. What would be the object of the plan which you propose, of sending the returns to the clerk of the union, instead of to the central authority?

My doubt is, whether the returns ought to be sent to the clerk of the union, or the magistrate's clerk. If I am asked that question, I should say decidedly the magistrate's clerk is the best, for this reason: in some unions the parishes of different counties are united; now, that is never the case in petty sessional divisions. The overseers of the poor have constantly to go to petty sessions, and the consequence is that they thoroughly understand all the business at petty sessions. Of course, if you have an Act, you make it compulsory. If you state that, upon the non-fulfilment of the condition, there shall be fines imposed, those fines would be all collected through, and all the informations would have to be lodged with, the magistrate's clerk; and therefore I think the magistrate's clerk would be a better vehicle of communication than the clerk of the union.

746. You would have the statistics collected through the petty sessional divisions, and not through the unions?

Quite so. The magistrate's clerk should collect the different schedules; he should put them in a form, and return them to the office in London.

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747. In what way would you propose to make the returns compulsory; would it be by a penalty?

I think a very small penalty of from 5*s.* to 20*s.* would be quite sufficient to enable you to get remarkably good agricultural statistics, because it is not only the amount of the fine which must be taken into consideration, but the trouble of attending before the petty sessions at the hearing the case, and at the same time being subject, as defaulters would be, occasionally to the jeers of their neighbours, for not having made their returns correct.

748. At what period do you think the inquiry should terminate; do you think May or June would be the earliest period at which you could satisfactorily return all the different cultivations, including turnips?

About the last week in June; even then, in turnips, it would not be satisfactory in some districts. However, I think what is of most importance is a return of the average of wheat; and my own idea is, that about June you will have a full return of the cereal crops; you will have a return of the wheat, barley, oats, clover, vetches, potatoes, flax, rye, and almost all the root crops; not, of course, the very late turnips; but you cannot specify a time to obtain the object you have in view, in which you could get a return of everything growing.

749. If the returns were all to be completed by the end of June, how soon after that do you think it would be important to have them collected together and published to the world?

The sooner the better; but certainly, if possible, previously to the harvest.

750. If they were published by the 1st of September, would that be sufficiently early?

No, I think not, to let the agriculturists know what is likely to be their yield, and at the same time to let those who supply the public know what may be the probable wants of the country.

751. What would be the latest period at which you think such information could be obtained with advantage?

I have stated, that I do not think it could be obtained later than the end of June.

752. Apart from the publication afterwards?

I should wish them to be got out by the 12th of August.

753. Earl of *Harrowby.*] Would you distinguish between spring wheat and winter wheat?

I do not think it is necessary; it is thoroughly understood that the spring wheat does not yield so good an average as winter wheat.

754. Is not that a reason why it is important to distinguish them?

You may or may not do so. There is now a wheat grown, which has lately been introduced into this country about nine or ten years ago, which is now extensively grown where barley used to be grown before; I am speaking of a spring wheat, which is Russian wheat. It is a bearded wheat, which is sown extensively, particularly in the hills of Gloucestershire and the hills in Somersetshire, with seeds, where barley used to be sown with seeds before: this Russian wheat is now frequently sown. It may be put in to the middle of May, and it will produce wheat in good order within a week or 10 days of that which was put in in the winter.

755. Is it equal in bulk to winter wheat?

No.

756. Does not all that point out, if there is nothing of importance sacrificed, that you ought to have the quantity of wheat put in, that is inferior in bulk, as an element in your calculation for the future?

I have not the least objection, except this, that in the first attempt compulsorily to carry out the system, you ought to make as few columns as possible; but barring that, it certainly, in a statistical point of view, would be very well to have two columns, one for winter, and the other for spring wheat.

757. *Chairman.*] What alterations would you be disposed to make in the Schedule which is annexed to the Report, and how would you have it stand, to be sent to the different overseers?

I have

I have no objection whatever to the first part of the Schedule, which includes the number of acres under tillage, and the number of acres under grass.

758. The whole of the first part you would leave as it at present stands?

Precisely. I think it is very well drawn up. Then we come to the second part of the Schedule, "Number of acres in houses, gardens, roads, fences, &c.;" that can be filled up by the overseer of the poor. "Number of acres in waste (if any), attached to the farm;" that must be filled up by the occupier. If the waste is common land, not attached to the farm, it can be filled up by the overseer. "Number of acres in wood and plantation;" that can be filled up by the overseer. "Number of acres in commons belonging to the parish,"' can be filled up by the overseer likewise. "Number of acres in holdings of less than two acres;" that can be filled up by the overseer. "Number of acres (if any), not accounted for;" that can likewise be filled up by the overseer; and the total can be given either by the magistrate's clerk or by the clerk of the union. For the reasons I have before specified, the whole of the last Schedule, relating to stock, I should for the present omit, but only for the present.

759. Have you considered the question, as to what amount of remuneration you would propose to give to the overseers for performing this duty?

I should propose myself that a shilling upon each return should be given to him.

760. From each separate occupier?

From each separate occupier: because the small holders' returns he would, in my plan, fill up himself, and for filling up the small holders' returns, and completing the list, possibly 5 *s.* may be allowed. I really think, in such a case as this, there can be no great objection if the penalty is made payable, one-half to the informer, and one-half to the poor of the parish; that it should be taken out of the poor-rates.

761. Earl of *Harrowby.*] You would pay one-half of the penalty to the poor-rate, in fact?

Yes.

762. Reimbursing the poor-rates for the charge?

Quite so.

763. Lord *Berners.*] You say that you would only require from the farmer his acreage, and you would not require from him his average of produce; do you think it is desirable that the average of produce should be taken by other means?

No, I do not; I would not institute anything like a spy system upon the farmer; I would leave it to be done as it is at present; there is no doubt it would be taken, because all the transactions which take place with foreign countries in the article of grain, I believe take place from the average being calculated in the way which I before specified.

764. Earl of *Harrowby.*] Would not that leave information in the hands of dealers in corn which was not in the possession of the farmers and the public?

I think immediately the return was perfected and published to the world, the farmer pretty well knows what is likely to be his produce, and would calculate it for himself; he will know what is likely to be his neighbour's produce; therefore he would be himself enabled to make the calculation required for himself.

765. Do you conceive that it is of more value to know that there is a greater fluctuation in the quantity of land under particular kinds of grain, than in the produce of the year?

No, I should scarcely say that; that there is a great fluctuation in the quantity of acres sown with particular kinds of corn there can be no doubt, because it must be perfectly apparent, I think, to any one who has looked at all at the state of agriculture throughout the kingdom, it almost invariably happens that if you have a low price of wheat one year, you have a less quantity of land devoted to the growth of wheat the following year, and *vice versâ*; if the prices are very good, every one wants to be enabled to get

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the same prices next year; and there is a greater quantity sown in the autumn than would have been had the price ruled lower.

766. Should you see any advantage in conveying to the public that information upon a public scale which is now confined to private speculators, getting sample fields to a certain extent, which might be used as the multiples of the number of acres, without exercising anything like a spy system upon the affairs of individual farmers?

If I thought you could do it through the farmers themselves without creating a feeling of dissatisfaction at the law, I should recommend it to be done; but I feel quite confident that it could not be done without causing a vast deal of dissatisfaction. Then how you are to get at it, without employing the farmers themselves to do the thing, or without setting a spy upon their actions, supposing it were done by the Government, I cannot understand; either way we are upon the horns of a dilemma; in the one case, generally speaking, the farmers would, if they possibly could, not give you their average; and in the other, if you sent a man down to take the average, they would say at once, he was a spy set upon their actions.

767. *Chairman.*] Have you noticed the returns which have been made from Scotland, and is it your opinion that those may be relied upon as affording a satisfactory estimate of the produce of the country?

Yes, I have; and I think they might be relied on; but I think they have a different description of men to deal with in Scotland to the tenant farmers of England; generally speaking, they have large holdings; when you get north, the holdings may be smaller; but, generally speaking, they are men, I think, as a whole, better off than the generality of English farmers.

768. May we not conclude, that when the English farmer finds that no injury is done to him by his giving these returns, and that obtaining such accurate information is generally advantageous to agriculturists, he will be induced to follow the same course which has been pursued in Scotland, and give all the information which is required?

No doubt he would do so; but I recommend you not to do too much at once. I think all the other matters may be worked out hereafter, if you do not attempt in legislation to do too much at first.

769. Have you observed the returns from Norfolk, and that, with the exception of two or three unions, the information seems to have been willingly given by most of the farmers in that county?

Yes. I thought the Government had every encouragement to extend the inquiry from the very satisfactory accounts which were given. Having extended the inquiry, upon reference to the Tables in the instance of Worcestershire, I find that there are in Worcestershire 393,071 acres given as statute acres; I find the returns are only from 236,620 acres; so that there are 150,451 acres unaccounted for.

770. Earl of *Stradbroke.*] That was only attempted in Worcestershire for one year?

Only one year.

771. Earl of *Harrowby.*] If you got good returns of a certain number of acres in a certain county, and those returns were published, would not that be, as far as it went, a datum point for calculating the condition of the whole harvest?

My belief is, that you could not actually rely upon such returns, for this reason: I think you would get the returns from the higher class of farmers, and their average would be greater upon their lands than upon the generality of lands in the country.

772. Comparing them year by year, would they not give the relative prospects of the harvest one year after another?

I do not think you could rely very much upon them.

773. Earl of *Carnarvon.*] To what extent would you propose to limit each holding from which you required a return to be made?

I would have a return made by every occupier who occupies, say, more than two acres.

774. Do

774. Do you think that the generality of English farmers who occupy slightly above two acres, would be capable of making returns, in a literary point of view, such as would not be complicated, and in fact would be fair returns?

Yes, if a palpably intelligible form was handed to them. Supposing they grow half-an-acre of potatoes, half-an-acre of wheat, and an acre of oats; there would be no difficulty to put down half-an-acre of potatoes, half-an-acre of wheat, and one acre of oats. I think they would be perfectly able to do that.

775. Lord *Berners.*] Assuming that there would be no difficulty whatever, either through the medium of agricultural societies or of committees formed in any county, to obtain the average produce of each district, not of each parish, do you think it would be desirable, having obtained that, merely to have a return made to the officer, whoever he might be, who received the return, that they believe that the average of the year is above or below the stated average of the district which was once recorded?

I do not think you can ever do much statistical good by voluntary associations; you may certainly in some. The Satistical Society is voluntary; you may do it in that way. I have always felt that the farmers might take up the thing excessively warmly for two or three years, but in the end the thing falls, and you do not get nearly the amount of information requisite; I quite think that if you can get respectable farmers together in a district, and ask them what their opinions were relative to the average of the year, they will give you quite as good a judgment as any other person by possibility can do, but at the same time, though they will give you what will be the average of the year, there is another important item which they cannot give you, namely, the number of acres in a particular part of the country, or the whole country planted with wheat.

776. I am supposing that we have a regular return from each parish, which is to be returned to the officer appointed, whoever he might be, of simply the acreage and the crop, not as to the average produce of the district, which might be obtained either from the parties you have been mentioning, or by any other parties under authority?

If you get the farmers voluntarily to enter into statistical societies, I think such evidence would be perfectly satisfactory, but the difficulty, as I endeavoured to explain in a former answer, is to keep them at work; you can set them at work, and for two or three years possibly they will go on working well, but the thing will fall upon them at the expiration of that time.

777. Lord *Colchester.*] Do you think it is possible to obtain the average produce of different kinds of corn for the last five years by any existing machinery, whether by the Agricultural Society or by any other means?

Not as the average is at present taken, certainly; because it must go entirely upon the averages sold in the towns, which by law at present make the returns.

778. By any local means?

I think by no existing means at present could it be done.

779. You could not get the past averages?

I can get the average as to price; as to quantities you must take the quantities that are sold in the different markets, which are specified in the Gazettes.

780. *Chairman.*] Do you think the mode of taking corn averages is satisfactory as regards price?

By no means. I need scarcely state to the Committee that an immense quantity of corn is sold in the country which never comes into the average; there is no check whatever upon the purchaser. Generally speaking, in our markets, it is not the small purchaser who makes his return, but it is the very large speculative purchaser, and, I need scarcely say, with no check upon him, that it is quite impossible to know whether the money alleged to be paid is actually the money which passed between the seller and buyer. My own opinion is, that there would be no difficulty whatever in requiring (and it would be a great check) that the seller should make his return as well as the buyer.

781. Would you require, in all cases, that the seller should make his return as well as the buyer?

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If you wish to get at all at the real average price, and, at the same time, at the average quantity of wheat which passes from the seller to the consumer, the only way would be to require a return from both the seller and the consumer; it should be given, whether sold in the country or in towns.

782. Do you think that system could be enforced in ordinary sales in the country between the farmer and the miller not taking place at market?

It would be very difficult; at the same time, I understood I was asked how I would ameliorate the present system, and I can only see that way of doing it.

783. Earl of *Harrowby.*] Would not the farmers resent that fully as much as taking an estimate of the crop?

I think not; I do not think the farmers would care about letting you know what their sales were, and the different prices obtained, as they could not nominally come before the public.

784. *Chairman.*] It has been suggested by a former witness that every miller should make a return of the corn ground at his mill; would that give any satisfactory result, in your opinion, and do you think it is a suggestion which could be enforced?

There would be a great difficulty, particularly as the trade is now opened so completely. The immense purchases that take place now of French wheat, Mediterranean wheat, and even of Russian wheat, to mix with English wheat, are such, that I think you would have great difficulty in enforcing the returns.

785. The witness who stated that that would be a good method of obtaining a return of the quantity of corn ground in the country, suggested that that might be met by deducting the whole amount of corn imported into this country for consumption, and the remainder would give the actual amount of British corn consumed in this country; is it your opinion that such would be the case?

I think there would be great difficulty about it; there are exports of foreign corn going on which never passes at all through the millers' hands: vast quantities are constantly shifted from one country to another under the present system. They merely pass through what I may term a warehouse, and this is merely a port of transit; and yet, having once come here and paid the shilling, it would be entered as corn. The difficulty would be in dealing with that description of corn.

786. Is there no record kept of the re-exportation of corn?

There is, no doubt.

787. Earl of *Harrowby.*] You must take stock to ascertain how much is in the store?

Quite so; it could be done; but I think there would be great difficulty about it. I think it would cause a great deal of extra trouble to the Custom-house officers, because you must constantly be taking stock, otherwise it would be of no use.

788. *Chairman.*] Is there any improvement which you could suggest to the Committee in the present mode of taking the corn averages, retaining the present machinery?

From what I have heard of farmers' opinions, I should say that the late alteration in the law, placing a greater number of towns in the average, has given satisfaction.

789. Earl of *Stradbroke.*] Are there not several important towns by which returns are not made, and several other towns where a small quantity of corn is sold by which returns are made?

Certainly. My recommendation would be, that the Board of Trade should look at every market that really has a certain quantity of corn sold weekly, and that that market should be placed in the list for estimating the averages.

790. *Chairman.*] Is it not the fact, that in some towns the returns are made by inspectors, and in others by excise officers; are you of opinion, that the returns are made more satisfactorily by one class of officers than the other?

I should rather myself put it upon the excise officers, because I think, if they make

make false returns, they have their situations to lose; whereas I believe the inspectors of corn averages in towns are not paid very well.

791. Is it your opinion that the returns have been made in towns by excise officers as accurately as in those towns where there is a regular corn inspector?

I should say quite so.

792. Is there anything else that you can state to the Committee to guide them to a conclusion upon the subject of their inquiry?

I think I have sketched out, in the answers which I have given, my recommendation that a Bill should be passed as rapidly as possible, rendering the return of agricultural statistics compulsory. I think great care should be taken not to make the fines too high; and when you have done that, I think everything should be done, where negligence takes place, either on the part of the farmer, on the part of the enumerators, or whatever you may term them, on the part of the overseers, and on the part of the returning officer, be he either the clerk to the guardians or the clerk to the magistrates, to punish it by a fine.

793. What course would you pursue, in the event of its being the opinion of the overseer that the occupier had made an inaccurate return; would you have him correct it himself, or what course do you think ought to be pursued?

That is the case I looked at when I recommended that half should be paid to the informer; the informer generally would be the overseer; and he would say, "Neighbour, you haven't put in a proper return; you will be fined. I know that you have so much land in wheat, and you have so much in barley; you had better alter your return." I think that if the farmer still remained of the same opinion, and would not do so, in all probability the overseer would say, "I must make a proper return; if you do not do it, I must inform against you." That would be the actual way in which the law would be carried out. By giving half to the informer, you would in a certain way put a check upon the farmer, through the overseer.

794. Would you enforce the penalty in case of an inaccurate return, as well as in the case of no return?

Certainly.

795. Who would be the officer before whom the information would lie; and what course would he take upon receiving information that the return was inaccurate?

He would, of course, come before a bench of magistrates; and the case would be heard and settled at petty sessions.

796. Would you propose that the bench of magistrates should appoint a person for the purpose of making a correct return?

I should leave that to be done upon examination by the magistrates. According to my system, the clerk to the magistrates would be the actual returning officer. Of course, it would be for him to inquire of the farmers. The justices would not grant a summons without a proper examination and proper information. Such a case, like any other case, must be determined upon the merits. The informer would say, "I know that this is a false return; I know that you have such and such fields, which are in the parish, and they are numbered so and so; those fields are in wheat, of which you have not made a return." By that means he would be able to check the return.

797. Would you give power to the magistrates to appoint a person to examine upon the spot as to the correctness of the statements of the farmer, or as to the correctness of the objections of the overseer?

Yes, I would do so, if it were necessary; but I think the magistrates who sit at petty sessions, generally speaking, know all the parishes, or most of the parishes, over which they act. I think the magistrates of petty sessions would be enabled, by the evidence brought before them, to decide the case, because, of course, if the farmer knew that the overseer was about to make a false charge against him, which he could by the summons served upon him, he would bring another farmer, or some inhabitant of the parish, to say it is not the fact; then, of course, the complaint would fail.

 798. You

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798. You think that might be decided upon the evidence before the Court?
Yes, it would be dealt with precisely like any other petty charge before the magistrates.

799. Earl of *Harrowby*.] You might require the overseer delivering in the return to countersign it, stating that it is correct, to the best of his knowledge?
Quite so.

800. You might make it an official duty on his part to see that it was a correct statement, and so enable him to make observations to his neighbours without assuming the character of an informer, by alleging the responsibility imposed upon him of giving his sanction to the correctness of the return?
Precisely; he has the power of doing it; with the rate-book in his hand he knows the exact number of acres of which each is in possession; he can say to the farmer, "There is something wrong in your return; you are down in the rate-book for 250 acres; you have only entered 180; what has become of the rest?"

801. *Chairman*.] It has been recommended by one witness, that instead of the overseers, you should employ the assessor of taxes in the parish, who is generally a more intelligent person than the overseer?
He may be more intelligent, but I am not aware whether he would be looked upon with the same feeling that the overseer of the poor would be.

802. You do not think he would be as good a person as the overseer?
I do not, nor could he have the same accurate means of judging by the rate-book of the correctness or otherwise of any return from his parish.

803. Earl of *Carnarvon*.] Have not many farmers objected to the present system of collecting the statistics, on the ground of its being optional?
On looking over the Report I find some of them say, that they would have no objection whatever to make a return, if that return were not discretionary, but compulsory. It is stated in this way by Mr. Hawley, at page 7 of the Report: "In the opinion expressed by some of the guardians of the impracticability of collecting agricultural statistics by means of voluntary compliance, I fully agree, for even were the general assent of the agriculturists given to the measure, there would always be found a few who, from obstinacy or neglect or some other cause, would fail to make their returns, and their default would not only entail a considerable amount of additional labour on the enumerators, and retard the classifier in the performance of his duties, but would vitiate the correctness of the general return for the unions, inasmuch as the hiatus caused by their neglect, if filled up at all, must be supplied by approximation. If, then, the voluntary system shall be found inadequate to the purpose, its defects can only be supplied by statutory enactment, rendering the making the returns compulsory."

804. Do you agree with the opinion that the farmers would, in some respects, be likely to acquiesce in the necessity of making the return when it came before them in a compulsory shape?
I quite think that would be the case if, as I said before, and have endeavoured to show throughout the evidence which I have given, you do not require too much.

805. *Chairman*.] Is it your opinion that the intervention of the Agricultural Society of England might be used in the same manner as that of the Highland Society is in Scotland, and do you not think it might obviate some of the objections which are felt on the part of the farmers to make these returns of the produce of their farms, if it was done through the intervention of the Agricultural Society, instead of a department of Government, or through the Poor Law Commissioners?
If such a subject were started at our meetings, it must be stopped as being a political subject, which we are bound by our charter not to enter into.

806. Why is it too political a subject to be discussed by the English Agricultural Society?
Because it would come from a department of the Government.

807. You

807. You are aware that the returns in Scotland are obtained through the intervention of the Highland Society: I want to know whether it would be possible to obtain the same returns from the farmers of England through the intervention of an analogous Society in England? *Wm. Miles, Esq. M. P.* 28th June 1855.

It has been mooted once or twice, but I very much doubt their even listening to it.

808. Earl of *Stradbroke.*] Do you think that the Agricultural Society of England has as much power and authority over the farming interest in England, as the Highland Society in Scotland has over the farmers in Scotland?

Certainly not.

809. Lord *Berners.*] Is it not a part of the charter of the Royal Agricultural Society, that no question shall be mooted that is either before Parliament or is likely to come before Parliament?

It is so.

810. Earl of *Carnarvon.*] Do not you think that one of the real objections which the farmers entertained to this measure, in the first instance, arose from a good deal of political feeling existing in their minds on the subject?

No; I really think, whatever feeling there might have been previously to the throwing open the trade in corn, that that feeling has gone by a good deal now.

The Witness is directed to withdraw.

LEONE LEVI, Esquire, is called in, and examined as follows:

811. Earl of *Harrowby.*] HAVE you paid considerable attention to the question of agricultural statistics? *Leone Levi, Esq.*

I have.

812. I believe you attended the Statistical Congress at Brussels two years ago, which took that question into its consideration?

Yes.

813. Will you just state the results, as far as you were witness to them, of what passed upon that subject?

At that congress the present question was discussed, and was taken up by the section which discussed the subject of commercial statistics. It appeared from the evidence given by various deputies that the several States represented had no estimates of produce before harvest. Where they collect agricultural statistics they are estimates of real produce, and collected at periodical intervals, say every five or ten years. The congress did not deal with the question of obtaining estimates so as to regulate the markets as we have in view in England; they dealt with it as a pure scientific research, in order to obtain the statistics of the resources of countries. With that view it was suggested that those statistics should contain facts relating to the soil; to the natural phenomena which fell under the knowledge of cultivators; to the implements used for cultivating the land; to the means employed to supply the substances wanted by the soil; to domestic animals; to the special culture of each useful vegetable; to the laws of production and consumption, and to the relation of agriculture to society. Those were the items suggested generally; but the specific recommendations of the congress were as follows: that, as to time, the agricultural statistics should be taken in the last quarter of the year; that they should be taken periodically simultaneously with the census of population, perhaps every ten years; and that they should comprise information as to the conditions, proceeds, and results of the agricultural industry of the country. Those were the recommendations of the Statistical Congress, and they did not go further. As to the mode by which such statistics are collected in foreign countries, it appears that in France—after several efforts made by the National Assembly, who had charged Lavoisier with assessing the land-tax; by Lagrange two years after; by Napoleon, who issued in 1810 a commission, which proved also unsuccessful; and then by the Bourbons, who issued another commission in 1814—the Government took it up in 1836, and, by means of the prefects and sub-prefects of all

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the departments, they were able to obtain the necessary statistics of agriculture. I believe that the prefects also give some early annual estimate of the produce, showing what are likely to be the wants of France for the year; but those circulars of annual yield are functions beyond those which are primarily required of them.

814. At what periods are those extra reports of the prefects made?
I am not quite certain about that.

815. Those would be the only returns which would come into exact relation to the objects which this Committee has in view, would they not?
The only returns. In Belgium they have a central statistical commission at Brussels, which corresponds with sub-commissions throughout the country, and those sub-commissions have the management of agricultural statistics as well as of all other statistics. The statistical department of Belgium is totally distinct from the other departments of the State; and the statistics of agriculture, industry, and commerce are combined in this statistical department.

816. Do they collect annual statistics upon this point for the purpose o governing the supplies?
No; I believe every five years only in Belgium.

817. Is there any country you know of in Europe which collects statistics in the manner or for the purpose which this Committee has in view?
I do not think there is any.

818. *Chairman.*] Do you know what course is pursued in the United States of America for the purpose of obtaining agricultural statistics?
No. I believe, however, the statistics of the United States are not of that correct character as they appear to be—given as they are by the bushel; they are estimates made, perhaps very roughly, by commissioners.

819. Are you acquainted with the mode pursued in the United States in any such statistics which are given to the public?
No.

820. Earl of *Harrowby.*] Was the question of the commercial importance of ascertaining annually, at an early period, returns of the agricultural prospects of the year considered in that congress?
No; I believe merchants consider it of very great importance to them to be as early as possible made acquainted with the probable wants of the country in matters of food; because I need not say that the prices of grain have a very great influence on the prices of all other articles, and the Mark Lane Journal is the barometer by which the value of all other articles is regulated. It is also of the utmost importance to merchants, in order to regulate their speculations and their orders abroad for other articles of consumption to be speedily informed whether we shall have abundance of grain at home, or whether we shall have to seek from foreign countries very large supplies. The influence of such uncertainty upon the funds is always remarkable, and upon the bullion in the Bank. The possibility of having to send a great deal of gold abroad has very considerable influence on private credit, discounting bills, &c. &c. All those transactions are very considerably affected by the uncertainty which prevails as to the result of the crops in this country.

821. Therefore, the earlier intelligence can be procured upon this main governing element of the mercantile prospects of the year the better?
Certainly. Suppose at the very last moment we should find ourselves to be in want of about five or six millions of quarters to be imported into this country in two or three months, of course the price of grain would rise enormously. Let us calculate that, owing to the suddenness of the demand, the rise might be about 6*s.* a quarter; the natural rise beyond it would have taken place if it had been known before. Then to these 6*s.* there must be added, also, a very considerable rise in the rate of freights; for instance, I find that, during 1846 and 1847, the freight from Odessa to this country for tallow, ruled from 50*s.* to 110*s.* a ton; and from the Danube, from 9*s.* to 21*s.* per quarter; and from Alexandria, from 6*s.* to 12*s.* during 1846. Now, let it be admitted that, owing to the suddenness of the rise, as we must have the grain speedily brought in, the rate of freight also should rule 6*s.* per quarter higher than need be; that would make

make nearly 10 *s.* a quarter, which, upon six millions, would prove a loss to the public of about 3,000,000 *l.* sterling. And this may actually be ascribed to our finding all at once to be in want of large supplies, and to the fact that for that reason speculation did not go on regularly from the commencement of the season to the last. There are other reasons besides in favour of obtaining such statistics as soon as possible: the later we are in foreign countries for our purchases, the less chance we have to obtain the grain. Our harvest here is about two months later than the harvest in Italy or France, and it is natural that, immediately as these countries find their crops to be very deficient, they should at once send for supplies, and as they are nearer to the Danube, from Marseilles for instance, than we are, they get their supplies provided for from the Danube, Alexandria, and other places, before almost we know ourselves that we also want them. This of course affects very materially the commerce of the country. The influence of such suddenness of rise in the price of grain, together with the rise of freight, has also great influence on the rise or on the decline of the prices of other articles of consumption here, because the more we have to pay for grain, the less we have to bestow upon other articles, and that affects the value of other articles, and our relations with such countries from whom we receive such articles of luxury; our exports are also affected from the same causes, and thus it acts and re-acts in many ways. I have thus contented myself in indicating what are the evils resulting from the present want of correct agricultural statistics. I know that estimates of the harvest are constantly made by private merchants and farmers, and these are abundantly published in the Mark Lane Express, and other papers; yet these estimates are generally uncertain, and are often made by interested parties. Indeed the conflicting nature of such information is often the source of extraordinary fluctuation of prices. I have not detailed the direct benefits of agricultural statistics, whether of those referring to the number of acres under cultivation, and under the several crops, to the estimate annual yield, or to periodical statistics of agriculture on an extensive plan. I believe they are likely to prevent great fluctuation of prices; to diminish the speculative character attached to all transactions in grain, and to enable us to obtain the necessary supplies for the year from foreign countries at lower rates, and with greater ease; and I believe, moreover, that such statistics will have a further important effect in calling forth greater energy among our farmers in the application of science into agriculture; in improving all the processes of cultivation, and in extending materially the agricultural resources of the country.

822. In fact, the prospects of the grain harvest are the great moving element of the whole of the mercantile prospects of the year, and the sooner they are ascertained the better for all classes?

Yes.

823. Have you ever considered this question as affecting the interest of the farmer himself?

I consider he stands upon the same level as the merchants, because, no doubt, whilst the merchants have often to pay dearer for grain on account of their ignorance, the farmer often sells a larger quantity in the first instance at lower prices than he was justified in doing; and this is especially the case with those who, being least acquainted with the general state of the country, go on selling; and, perhaps, after they have sold all they have, they find that those who have been fortunate enough to hold get double for their produce. If information was more general, they would only be disposed to sell such portions as they are under necessity of selling, and that would enable them all to participate in the rise when that rise happens.

824. Is it not thought a very important element in the manufacturing districts of Lancashire to ascertain, as early as possible, the prospect of the cotton crop; and is not the prospect of the grain crop, in fact, a similar question with respect to other classes in England?

Very similar; with respect to the cotton crop, it is by induction that the markets are regulated; that is, it is according to the number of bales sent to the shipping ports of the United States from the interior on certain days and certain months that calculations are made as to the possible results of the produce for the year. It is astonishing what an influence is produced upon the prices

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wherever, during any one week, there has been sent to the shipping ports any less number of bales than formerly. This at once gives a tone to the market in view of the possible scarcity of the cotton crops for the year; and immediately afterwards the prices of cotton manufactures rise, so that the slightest indication ascertained by facts of a possible abundance or scarcity in the cotton crop has very material influence upon the entire cotton trade and manufactures of the country. Let it be, moreover, remembered, with regard to the question of the probable supplies of grains, that our dependence upon foreign grain is yearly greater; for instance, from 1840 to 1846, we imported nearly 23,000,000 quarters of grain, giving an average importation of 3,000,000 quarters.

825. Including flour?

All grain and flour. From 1847 to 1853, in seven years, we imported 67,000,000 quarters, or 9,500,000 quarters of grain on an average per year, so that we are every year more dependent upon foreign supplies, and therefore we are the more interested in knowing early any extraordinary deficiency. As the returns for the last seven or eight years pretty well indicate what are the normal wants of the country, any extraordinary deficiency would increase the want from 10,000,000 to 15,000,000, and render it even more difficult to procure such supplies, and more necessary it is to be first in the market wherever it can be got from.

826. Lord *Colchester*.] Do those quantities increase regularly, year by year, or do they fluctuate?

The import in 1840 was 3,900,000; 1841, 3,600,000; 1842, 3,600,000; 1843, 1,400,000; 1844, 3,000,000; 1845, 2,500,000; 1846, 4,700,000. That is the first period of seven years. The second period of seven years is, 1847, 11,900,000; 1848, 7,500,000; 1849, 10,600,000; 1850, 9,000,000; 1851, 9,600,000; 1852, 7,700,000; 1853, 10,000,000: and in 1854 we imported 8,000,000 quarters.

827. It is not a regularly progressive increase, but has fluctuated from the season and other circumstances?

Yes; except that during those last seven years we never have had the importation go back to 2,000,000 or 3,000,000, as we used to do formerly.

828. There was a great change in the law about that period?

That may have affected it very much, but our consumption was greater.

829. Earl of *Harrowby*.] During those seven years, what is the highest and what is the lowest importation?

The highest was in 1847, when we imported nearly 12,000,000; and the lowest in 1848, when it reached 7,500,000; and again in 1852, 7,700,000. It is very singular to observe how very little wheat is produced in Ireland and Scotland; from the last account of those two countries it appears that the produce of wheat in Ireland was only 1,133,585 quarters, and in Scotland only 600,000 quarters. Now this suggests, also, our wants of foreign wheat, that must be always large: there were 10,000,000 quarters of oats produced in Ireland, and 4,000,000 produced in Scotland; but we require a considerable quantity of wheat from foreign countries.

830. Is there any record of the import of wheat and flour into Scotland?

I am not aware into Scotland. The consumption of wheat for the United Kingdom as given by M'Culloch was 16,000,000 of quarters of wheat. If 2,000,000 of quarters only are produced in those two countries, what is the quantity of wheat produce in England? I suppose that for wheat alone we must be very much dependent upon other sources.

831. What would appear to be about the monetary range of value of the grain imported between the highest and the lowest years?

The monetary value would result from prices. I find, from a list I made out of the highest and lowest prices for each year, that the highest price during this period from 1840 to 1854, was in 1847, when it was as high as 102*s*. 5*d*. a quarter; and the lowest during that same period of 15 years, was in 1851, when it was 35*s*. 11*d*. per quarter.

832. Are you speaking of weekly returns, or what?

The monthly average for 1847 was 92*s.* 10*d.* the highest, and 52*s.* 3*d.* the lowest: but the highest weekly average in that same month was 102*s.* 5*d.* I find, taking the average of all the averages for the whole period together, that the highest would be 61*s.* 7*d.*, and the lowest would be 46*s.* 10*d.* The highest and lowest from 1840 to 1854—(*See* NOTE.)

833. Have you added the highest of each week or each month?

The highest and lowest of each month.

834. The highest of each is 61*s.* 7*d.*; the lowest average of the same kind is 46*s.* 10*d.*?

Yes, the highest and lowest: the difference of prices in 1847 was 40*s.* a quarter, or 2*l.* a quarter. And there is another curious observation out of these prices: it appears that the months when the highest prices ruled were mostly July and August; for this there may be two reasons. It may arise from sudden deficiency in the quantities of grain on hand of the old crop, from the non-arrival of foreign grain, or from the bad prospects of the next harvest. In many cases where a sudden rise in August takes place from a sudden want, it shows a want of agricultural statistics; because if we knew it sooner we should not be all on a sudden finding our rick-yards empty, and all on a sudden wanting extra supplies from abroad. I presume if we had agricultural statistics in time, the rise would not take place in August, but would take place in March or April, or earlier still, and so on progressively from the commencement of the year; immediately, in fact, as the harvest operations are over. In 1847 the highest was in June; in 1842, 1849 and 1851 the highest price was in July; in 1841, 1843 and 1850 the highest prices were in August. I am not now specifying what were the reasons, as I said it may have arisen from bad prospects of the crops in this or other countries, and again from the scanty remainder of the former years. As to the lowest prices in 1840, 1841, 1842, 1847, 1849 and 1852, the lowest prices ruled in December and January. If we had agricultural statistics after a bad harvest, prices would generally begin to rise in December and January, and yet those are the months when generally prices ruled the lowest.

835. Lord *Portman.*] Why should they rise in December and January?

If the agricultural statistics obtainable in August or September were to tell us that we are likely to have a want of 10,000,000 quarters this year, immediately prices

(NOTE.)—HIGHEST AND LOWEST PRICES.—MONTHLY AVERAGES.

	Highest.			Lowest.			Extent of Fluctuation.					Period of Fluctuation.
	s.	*d.*		*s.*	*d.*		*s.*	*d.*				
1840	72	6	Aug.	59	4	Dec.	Decline	13	2	Aug. to Dec.		4 months.
1841	73	4	„	61	3	Jan.	Rise	12	1	Jan. „ Aug.		7 „
1842	64	9	July.	47	4	Dec.	Decline	17	5	July „ Dec.		5 „
1843	59	7	Aug.	46	2	April.	Rise	13	5	April „ Aug.		4 „
1844	56	3	Mar.	45	3	Dec.	Decline	11	–	Mar. „ Dec.		9 „
1845	58	10	Nov.	45	3	Mar.	Rise	13	7	„ „ Nov.		8 „
1846	60	7	„	46	3	Aug.	Rise	14	4	Aug. „ „		3 „
1847	92	10	June.	52	3	Dec.	Decline	40	7	June „ Dec.		6 „
1848	54	2	Sept.	47	7	June	Rise	6	7	„ „ Sept.		3 „
1849	48	3	July.	39	3	Dec.	Decline	9	–	July „ Dec.		5 „
1850	43	8	Aug.	37	10	April.	Rise	5	10	April „ Aug.		4 „
1851	42	11	July.	35	11	Oct.	Decline	7	–	July „ Oct.		3 „
1852	43	3	Dec.	38	4	Jan.	Rise	4	11	Jan. „ Dec.		11 „
1853	72	5	Nov.	44	2	April.	Rise	28	3	May „ Nov.		6 „
1854	80	10	Feb.	56	7	Sept.	Decline	24	3	Feb. „ Sept.		7 „
	61	7		46	10		Average	18	–		Average	5½ „

MONTHS OF HIGHEST AND LOWEST PRICES.

1854	February.	1841	January.
1844	March.	1852	„
1847	June.	1845	March.
1842	July.	1843	April.
1849	„	1850	„
1851	„	1853	May.
1840	August.	1848	June.
1841	„	1846	August.
1843	„	1854	September.
1850	„	1851	October.
1848	September.	1840	December.
1845	November.	1842	„
1846	„	1844	„
1853	„	1847	„
1852	December.	1849	„

In December and January, for seven years, prices were lowest, although they are the best months for importation.

In July and August, seven years, prices were highest, when all other countries have been provided for.

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prices would rise accordingly, and speculation would sooner be set in motion; and whilst we would not experience a sudden and extraordinary rise, prices would be maintained on a high level.

836. You say that, for some reason or other, in December and January prices have been lowest?
Yes.

837. Looking at our present state of ignorance, are there any circumstances which would lead you to think, while we remain in the same ignorance, that those are probably the months in which the price would be the lowest?
Yes; there are reasons to believe that in those months prices under ordinary circumstances would rule the lowest, because farmers have then generally larger quantities on hand, and they bring it freely to market; at the same time, if agricultural statistics were to point out that prices during the whole year are likely to rule higher than immediately after the harvest, the farmer and speculator would at once become acquainted with it; and the one would keep the grain back, and the other would give higher prices, and so would prevent prices ruling very low up to a very considerably advanced period. As it is, all on a sudden, the harvest may be found to have been very deficient; and instead of having abundance at home, we are at the last moment reduced to the necessity of obtaining from abroad very large quantities at any prices it can be had.

838. Looking at the months of December and January, are there not circumstances that exist now which are very likely to continue to exist, namely, that it is a time of year most convenient for the farmers to thrash for the purpose of getting straw, and a time of year when they also think it expedient to thrash for the purpose of selling to pay their rent?
Yes; at the same time all those circumstances would be modified had they the knowledge I have indicated. Some sacrifices would be made in other ways in order not to sell their grain, which, if kept a month longer, would fetch a much higher price.

839. Earl of *Harrowby.*] Would not persons be more willing to make advances upon the farmers' produce, having better data for knowing their prospective value?
Yes; if they knew the farmer was likely to get considerably more for his grain next month than now, they would say, we would rather give you any help you want just now, but keep the grain to sell at a better price.

840. You would put into the hands of the public as early as possible, including the grower, that information which at present is confined to a few enterprising corn merchants, who think it very important for their own interests?
Certainly.

841. Lord *Colchester.*] Does not it appear that for the 14 years, prices have always risen as the month of June approached?
Not always; in 1854 the highest price was in February; in 1844 in March; in 1847 in June; in 1842, 1849 and 1851 in July; in 1840 August; in 1841 August; in 1843 August; in 1850 August; in 1848 September; in 1845 November; in 1846 November; in 1853 November; and in 1852 December. The lowest was in 1841 in January; 1852 in January; 1845 in March; 1843 in April; 1850 in April; 1853 in May; 1848 in June; 1846 in August; 1854 in September; 1851 in October; 1840 in December; 1842 in December; 1847 in December; 1849 in December. Those are just the lowest prices in those months.

842. Lord *Portman.*] In one year, September is the highest?
One only, in 1848.

843. Would that arise from that being the seed time?
I am not aware.

844. Lord *Colchester.*] Would not anybody speculating in corn be inclined to purchase in December for the purpose of holding back?
They would certainly, if they knew that much quantity was required; but as we are not acquainted with what are likely to be our wants, buyers do not come

come to market so freely when the prices rule low; afterwards it is found that the farmers have not much on hand, and so prices rise.

845. Lord *Portman.*] Is it your opinion, that there is at present as large a number of gentlemen engaged in the corn trade as corn factors as in the early part of your recollection?

I am not aware. Another interesting observation may be made as to the time employed during the oscillation of prices; for instance, it appears that on an average, the time employed in the decline or rise of prices, whatever it may be during the year, was in the 15 years already alluded to, 1840 to 1854, 5 ½ months; so taking 1840, from August to December, the price declined 13 *s.* 2 *d.* a quarter in four months; in the next year, from January to August, it rose 12 *s.* 1 *d.* in seven months; the next year it declined, from July to December, 17 *s.* 5 *d.* in five months, and progressively. The average of the whole would be 5½ months. —(*See* NOTE, p. 131.)

846. Lord *Harrowby.*] What inference do you draw from that?

It is important for this reason, that it shows the suddenness in which profits and losses take place in the grain trade; and as the extent of the fluctuation is often 50 or 100 per cent., it is very important to see how soon such are realized, and how soon prices are expected to rise or go down.

847. You mean to say the oscillations are more rapid?

The average oscillation is 5 ½ months, that is, the average of the times employed in the oscillations of all the years.

848. That gives more of a speculative character to the trade than would be the case if more complete knowledge were acquired?

Certainly; for instance, in 1852, when there was not much oscillation, the difference was from the highest to the lowest only 4 *s.* 11 *d.* over 11 months, and in 1847 the decline was 40 *s.* 7 *d.* in six months, showing the steadiness of the rise in the one case, and in the other a very rapid decline.

849. Both these operations, the rapidity in the one case, and the slowness in the other, took place under the same amount of knowledge as to the conditions of our own harvest?

Certainly; in 1847 the price rose rapidly to 102 *s.*, and then as rapidly fell down, because there was a prospect of a good harvest next year.

850. Earl of *Stradbroke.*] Was not that in consequence of there being an abundant harvest on the ground in the month of August?

Yes.

851. Earl of *Harrowby.*] Would not an earlier knowledge of the real prospect of the harvest tend to mitigate those oscillations, and spread them over a wider surface?

That just refers to the previous question: the rise would commence earlier, and as soon as we knew that we should want a greater quantity; so that the rise would spread over longer periods than at present.

852. Earl of *Stradbroke.*] Probably the price would not arrive at so high a pitch?

Certainly not; it would bring in additional supplies in time, and we should never be under the necessity of suddenly going to other markets and fetching the grain at whatever price we can have it, and at whatever freight; when we are so pressed we can only have what we want by paying 20 per cent. or 40 per cent. higher than we should have paid had we sent our orders cautiously in due time.

853. Earl of *Harrowby.*] Do not the very high prices, which are sometimes arrived at under the present circumstances, rather go to the profit of bold speculators than of the farmers?

I think so; in many cases speculators may happen to lose more, perhaps, than they have gained by the suddenness of the fall. Some who are fortunate enough to stop in time get enormous profits; and others, again, who are entering into speculation, perhaps too late, or hold the grain too long in their hands, lose, perhaps, far more; so that it is a very great speculation altogether.

854. Lord *Portman.*] With regard to the necessarily speculative character of

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the trade in wheat, have you observed the state of the trade in the year 1854, and up to the present time in 1855?

Not particularly.

855. Are you aware of the extraordinary sudden changes which during the summer of last year took place in the price of corn?

Not in connexion with this inquiry.

856. Supposing the fact to be, that during the last twelve months the fluctuations had been quite extraordinary, sometimes there being a large rise, at another time a large fall, and at other times, week by week, and in parts of weeks, the fluctuation has been 1*s.* up and 1*s.* down; are you of opinion that supplying agricultural statistics in the way which you suggest would tend to relieve all parties from the extraordinary hazard of speculation which is consequent upon such a state of things?

Partly. I do not think agricultural statistics would cure all the evils, because it would still be dependent upon other contingencies, such as the war with Russia, which would materially alter the circumstances. If we had the knowledge that we want 10,000,000 quarters, and we are likely to get it from foreign countries, and if other circumstances happen that we cannot get it, and it is uncertain how far we may be able to get it, that uncertainty would still cause the prices to fluctuate.

857. Would not the uncertainty be diminished if we knew the quantity of acres of wheat grown in this country?

To a certain extent.

858. Earl of *Harrowby.*] Have you given any attention to the best mode of collecting agricultural statistics in this country, not, as in foreign countries, at long intervals for the purpose of ascertaining the general condition of the resources of the country, but for the purpose of guiding the public year by year in their transactions in respect to this particular article?

I have. Last year I read a paper at the Society of Arts on agricultural statistics, and we had a very considerable discussion. I had prepared a plan for the collection of such statistics, in the preparation of which I was assisted by most eminent men, both surveyors and very experienced farmers. The conclusions arrived at then I have to a certain extent modified: the first proposition was, that a Central Board should be established, and authorized to obtain annual returns of the total acreage, distinguishing estimates from ascertained acreage comprised in each district, showing therein the total acreage of each parish or extra-parochial place within the district separately, together with the acreage of the several crops, or state of the whole of the land in such parish. This would so far provide for the acreage and croppage such statistics as we have now for Ireland, and also for Scotland through the medium of the Highland Agricultural Society. In order to do this, it is very important that the survey of the whole country be completed as speedily as possible. I understand, however, that the acreage of land in the several parishes in England and Wales is known with sufficient accuracy for statistical purposes; but although that would not be altogether a practical hindrance to obtaining agricultural statistics, a complete survey would be of extreme importance. Now the question was asked, by whose instrumentality the acreage and croppage should be ascertained. I confess, when I read the paper I have already alluded to, I recommended that a Central Board should be formed; and that that Board should correspond with the Boards of Guardians throughout the country; but now I doubt the expediency of such a recommendation; and reading the Report of the Poor Law Board, I am quite satisfied that the Poor Law Guardians are not the best medium to use for such a purpose, owing to the unpopularity which surrounds them, and the very reasons which they themselves have given, that they cannot get the co-operation of the agriculturist, and that gentlemen refuse to co-operate owing to their small remuneration, and the party and political feeling which prevail against them. Then again, with respect to interference, it is considered amongst agriculturists that they would not like to see the Boards of Guardians interfere with them. And then there is another very important element, viz., that the Board itself may change every year; so that the question must undergo discussion at every change. Another reason is, that they make it too formal a thing, and frighten the farmers. I conceive the simpler the instrumentality the better:

and

and taking those considerations, and seeing what has been done by the Registrar-general in the collection of the Census, I think that would be the proper medium through which to collect these statistics. According to the Act of Parliament relating to the Census, individuals were required to state in what business they were engaged. There is the word "farmer" put down, and in order to specify who are farmers (because there are some who are farmers who have no lands), they got them to put down how many acres of land they cultivated. Such information was obtained from 200,000 or 300,000 farmers. The simplicity with which the inquiry was made is well known. The want of anything like form or stateliness gave confidence to the farmers, and they gave in the schedules a most accurate account, without thinking of any interference, or having any suspicion in the matter. Perhaps it is not desirable to tax the people, or any class of people, with a desire to speak untruth, or with the desire to conceal the truth. Let us send schedules in the usual simple way, and you will find there will be no objection, except on the part of a very few, to give such accounts. There is a great deal in the instrumentality used which creates suspicion, where there is no occasion for it. Under those circumstances, it occurred to me that the Registrar-general of Births, Marriages and Deaths should be instructed to obtain such returns annually, in the same way as the census of population was obtained, by leaving schedules with the farmers to be filled up, with the necessary information; the same to be compulsory, with a small fine, just to give it the form of a duty. Those returns of acreage and croppage should be forwarded to the Central Board on or before the 1st of June in each year. The same Registrar to be also requested to obtain annual returns of the produce of crops from the farmers, by means of other schedules, leaving it voluntary on their part to afford other information. If such information cannot be obtained from the farmers, it should be the duty of the Registrar to procure it.

859. *Chairman.*] Have you any personal knowledge of the habits of the farmers of this country, or are the opinions which you are expressing merely opinions formed from reading the reports, and the information therefrom derived?

Merely from reading the reports, and conversing with such individuals as I conceive to be fully acquainted with the feelings of such classes. Having obtained the acreage and croppage, and approximate returns of the produce, the estimate yield of the crops for the year should be made by inspectors recommended by the Inclosure and Copyhold Commissioners, who have charge of the survey, and who are quite *au fait* at the maps of the country, and they should be instructed to superintend certain defined districts, representing, as far as possible, the average of the country in which it is situated; each return to be signed by such inspector. For the formation of such an estimate, the relative produce in former years, the number of grains in the ear, and the weight of certain quantities, would form approximate data, and such a calculation might be made with the assistance of a chemist, a botanist, and a farmer. The inspection and estimate should be made during the month of September, or as soon after as possible, and transmitted to the Central Board. To complete this information, meteorological observations might be made throughout the country at certain periods after this estimate, to learn the possible effect of the weather upon the crops; and those meteorological observations made on a national system would bring up the information to the last moment of the harvest. I conceive that in order to render this Board of an independent character, and that it be recognised as altogether free of politics, it should be connected with the Board of Trade. It seems to me that there ought to be a Board of Agricultural Statistics in connexion with the Board of Trade, and that that Board should receive the information through the medium of the Registrar-general or the Copyhold Commissioners, as they may think best, without giving it to either body to do it, or even to establish a Board apart altogether. As to the cost of such an operation, it may perhaps be considerable, and likely to amount to 50,000*l.* or 60,000*l.*, or perhaps 80,000*l.*; but when we consider that the oscillations and loss to the public in any year may be millions of money, an expense of even 100,000*l.* to the public is of no importance.

The Witness is directed to withdraw.

Mr. FREDERICK BUNTER, Deputy Comptroller of Corn Returns, is called in, and examined as follows:

Mr. F. Bunter.

28th June 1855.

860. *Chairman.*] YOU have been largely engaged in making inquiries about the present mode of taking corn averages, have you not?
I have.

861. Do you consider that the course at present pursued affords an accurate measure of the quantities of grain?
Not of the quantities.

862. With regard to the price, is it accurate as far as that is concerned?
I believe it is very nearly, with the exception that in some cases the grain is resold, and consequently increased in price, and it is returned in both instances.

863. To that extent, you would not consider it a fair test of the average price of corn sold in England?
Not to that extent.

864. Can you propose any mode by which the corn averages might be taken more accurately?
If returns were made to the inspector of first sales only, the increased value which arose from after sales would be avoided.

865. Would you propose for that purpose, that the returns should be made by the seller and not by the buyer?
Not at all.

866. How would you propose to carry it into effect?
By compelling the buyer to make returns of such grain only as he purchases from the grower.

867. Would you propose that a return should only be made of corn sold in markets, or would you also include corn sold by the farmers to the millers in other places, and sometimes apart from the market?
Everything which is sold by the grower to the dealer should be returned, whether the transaction take place in the market or elsewhere.

868. What do you think has been the effect of increasing the number of towns which have to make returns of the sales of corn; has it made the returns more accurate than they were before?
I do not know that it has; I do not think there is much difference between the average price of the new towns and of the old towns.

869. You think that the effect of increasing the number of towns has not been to give a more correct average, but that the average was obtained sufficiently correct when it was only given by fewer towns?
No; I mean that the average of the new towns appears to be very much the same as of the old, and there is no evidence to show whether it has had any effect or not; it is impossible to speak with certainty about it, but the more extended the area from which the returns are obtained, the more likelihood there is that the averages will be fair and accurate.

870. Lord *Colchester.*] Does not the fact, that the more extended area gives the same return, show that the return of the smaller area was correct?
There has never been any calculation made in order to ascertain if the average has been affected by the addition of the 140 new towns.

871. The corn averages only show the quantities, and not the prices?
The aggregate quantities sold in the old and the new towns respectively are published, but not the aggregate respective prices.

872. Earl of *Harrowby.*] The prices in each town are not published, but only the price generally?
The difference in quantities between the old and the new towns is published; the old towns being about four-fifths of the whole, but the aggregate prices relatively of the old and new towns have never been made up or published.

873. Have

873. Have you any means of ascertaining what effect upon the average of prices the addition of the new towns has had?
I do not believe it is known; it could be known.

874. *Chairman.*] Having had much experience in this matter, do you think the addition of the new towns to the old towns which formerly were required to make returns has given the public a more correct average of the price of corn sold in this country?
I do not know that it has; I had not any experience of it previous to the addition of the new towns.

875. Do you think that any advantage has been obtained by extending the area from which returns of the sale of corn was required?
I do not know that there has been.

876. Earl of *Harrowby.*] Are there any special data from which you could obtain returns of the prices from the old and the new towns for a certain period, so that you could test the effect of the addition of the new towns?
There are.

877. Lord *Colchester.*] Such information has never been required?
Never.

878. Earl of *Harrowby.*] The point has never been yet investigated?
Not that I am aware of.

879. *Chairman.*] Have not the returns, which have been made from the new towns, been made by the excise officers?
Entirely.

880. No corn inspectors have been appointed in any of the new towns?
Not any.

881. Have the returns been as fully made by excise officers as those returns which were made by corn inspectors?
I do not think they have generally; the excise officers are removed every three or four years, and consequently they do not obtain the amount of local information which is requisite, nor become sufficiently acquainted with the dealers.

882. Can you suggest any improved mode of taking corn averages upon the present system, or any other system, by which we might obtain either better or equally accurate average prices of corn sold in this country?
I do not know any mode by which more accurate averages could be obtained than by the present system, with the alteration mentioned.

883. With regard to quantity, of course it is in your opinion a very imperfect gauge of the quantities of corn sold, because great quantities of corn are sold which never come into the returns of the corn inspectors, or of excise officers?
Clearly.

884. You have no suggestion to make with regard to any improvement in the mode of obtaining these averages?
I think that if only such grain as is purchased of the grower were returned, it would have the effect of making the averages more correct, because the same grain is sometimes resold on two or three occasions, and the price is consequently raised.

885. Lord *Portman.*] I think you stated that you proposed that the first sale only should be made known, and that it should be made known by the parties who bought from the growers; are you of opinion that it would be more easy to obtain the return from the parties who bought from the growers, than from the growers themselves?
Yes; the growers themselves are perhaps, not in all cases, sufficiently accustomed to statements of account, and therefore it would be undesirable to call upon them to make the returns.

 886. Supposing

Mr. F. Bunter.

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886. Supposing a man sells 100 quarters of wheat for a certain number of pounds; if he cannot write, he could report to the inspector that he has sold 100 quarters of wheat for 100*l.*; would there be any difficulty in getting such a fact as that?

Not in that way; at the same time if the growers and the buyers both made returns, and there was a difference between them, it would be very difficult to ascertain who was in the wrong, and the delay which would consequently arise in publishing the averages would be very great.

887. Supposing you were to set aside the buyers altogether, and call upon the grower to make the return, what should you say to that?

I do not believe the returns would be as accurate as at present, because, although perhaps at first there would be a good deal of interest felt in it, that would very soon subside.

888. Are you aware whether or not it is the fact that in many towns which are called return towns, almost no quantity of corn is returned as compared with that which is sold in or about the market town?

Yes; I believe it to be the fact.

889. Are you aware whether, in the towns in which the inspectors have been excise officers, instead of the parties who used to take the returns, there has been any difference in the quantity of wheat returned since the change?

I know an instance in which there has been a very great difference. In the town of Ipswich there has been something like the difference between 58,000 and 80,000 quarters.

890. Therefore, the present mode of taking the returns is even more unsatisfactory than it used to be in the early part of the attempt?

Under the former inspectors. Perhaps Ipswich was a peculiar instance, inasmuch as the individual was a banker, and had so much communication with the farmers and millers, that he was enabled to collect more returns than perhaps any other person could.

891. Is not the tendency of your opinion that, by some means or other, it is desirable to get returns of first sales from the grower?

It would be desirable to obtain the first cost.

892. Do you find most fault with the return of the quantity, or the price?

With the quantity.

893. You think the price is pretty nearly the truth?

Yes, as far as I am aware.

894. Earl of *Harrowby.*] Do you believe that the quantity returned is a fair sample of the reigning price of the district?

I have every reason to believe so.

895. There is now very little inducement, in any way, to tamper with the averages?

There is very little inducement, and the addition of the new towns makes it more difficult. The danger of lessening the number to any small amount would be, that there would then be the possibility of increasing the price, at the will of the dealers, to a certain extent.

896. Now that there is only one fixed low rate of duty, there is very little temptation to tamper with the average?

There is not the same temptation, but still there may be circumstances which would induce sales for the purpose of raising or lowering the average, provided there was the power to do it.

The Witness is directed to withdraw.

JAMES

JAMES BUCKLAND, Esquire, is called in, and further examined as follows:

897. *Chairman.*] HAVE you anything to add to your former evidence, which you wish to state to the Committee?

I have. I prepared for my own use, some time since, an estimate of the probable cost of carrying out the system which I had the honour of submitting to the Committee on Monday. I have taken this estimate upon the supposition that the United Kingdom should be divided into 17 districts, corresponding with those which I mentioned to the Committee before. I have also assumed, that the cost of each district may be presumed to average somewhere about 1,800*l.* per annum, which would make a total, for the United Kingdom of Great Britain and Ireland, of about 30,000*l.* per annum. With the permission of the Committee, I will read the estimate which I have prepared.

The same is read, as follows:

SUPPOSED ITEMS of EXPENSE in each District of 4,000,000 Acres.

	£.	*s.*	*d.*
Printing 50,000 forms for occupiers' schedules	150	–	–
Printing forms and instructions for union clerks, relieving officers, &c. &c.	25	–	–
Carriage of above forms from the district commissioner to the union clerks	15	–	–
Delivery, by union clerks, of the requisite number of forms to the parish officers, and subsequently receiving or collecting the returns to be forwarded to the district commissioner, at 5*s.* per 100	125	–	–
Delivery, by parish officers, of forms to the occupiers	125	–	–
Professional valuators of the produce of recusants (say) on 200,000 acres, which might be made 10 days prior to harvest by 20 valuators, including enumeration of stock where necessary, and filling up the forms after completing their calculations	400	–	–
Carriage of forms returned to the district commissioner from the clerks of unions	15	–	–
Printing forms for commissioner's collation of returns into parishes, unions and counties	10	–	–
Commissioner's extra assistants in arranging all the foregoing returns into parishes, unions and counties, for delivery to the Board of Trade within eight weeks after receipt	100	–	–
Sundry postages, travelling expenses, contingencies, &c., by clerks of unions, overseers, commissioners, &c.	150	–	–
Commissioner's annual salary, including incidental expenses	685	–	–
TOTAL COSTS for 1-17th of the United Kingdoms £.	1,800	–	–

J. BUCKLAND.

In the sum of 685*l.* for the Commissioner's annual salary, including incidental expenses, I, of course, presume that the Commissioner's time will not nearly be employed in arranging and classifying the materials, but that a large portion, if not the whole, of the remainder of the year may be advantageously engaged in communicating information to agriculturists generally, in visiting their respective neighbourhoods, their clubs and societies, and at the same time in collecting information which may very materially assist in correcting any possible inaccuracies which may be found to have existed.

898. The paper which you have read is a statement of the expense of the scheme which you propose to the Committee, is it not?

It is the detail, and showing how those details are supposed to arise. I was asked a question as to the period for making the returns: I think the corn should be estimated at all times, as nearly as possible, when the old stock is exhausted, or when it is reduced to so low an ebb, that in all probability that which remains will be held for somewhere about one or two months longer.

J. Buckland, Esq.

28th June 1855.

899. Do you consider that there is any fixed period at which the returns might be made?

I consider that the 31st of August, the day I have named, is decidedly preferable to the 31st of October. As the month of August sounds early, I will take the 1st of September; and as the month of October may also sound early, I will take the 1st of November, in referring to the two dates. The Committee will find that the estimates should be made shortly before wheat-sowing is commenced; for, unless that be the case, the farmers will in all probability be thrashing for their wheat-sowing, and, independently of that, a portion of the stock of old corn will have been committed to the ground, and will be out of sight, and thus most materially interfere with the estimates from year to year, if they are to be consecutively made as to the existing stock in the country, as well as with the prospects of the forthcoming year. Another advantage between the 1st of September, as compared with the 1st of November, would be, that the farmers, on the 1st of September, would be too much occupied in their general harvest-work to be thrashing out corn, or sending the corn to market; and another advantage I conceive will be this, that it would then be exceedingly practicable that the report of the estimate of the wheat, supposing the estimates and the areas be confined to wheat, may be brought before the Board of Trade within a month or six weeks from the 1st of September, and that it may have that publicity given to it which would assist all the mercantile operations before the seas in the icy regions are frozen up; which, if the estimates are not taken until the 31st October, or the 1st November, could not be published till it would be too late to take advantage of supplying any probable deficiency from those countries.

The Witness is directed to withdraw.

Ordered, That this Committee be adjourned.

Accordingly adjourned.

Die Veneris, 20° Julii 1855.

LORDS PRESENT:

Earl DONCASTER.	Lord BERNERS.
Earl CARNARVON.	Lord COLCHESTER.
Earl HARROWBY.	Lord PORTMAN.
Earl STRADBROKE.	Lord STANLEY of Alderley.
Earl BURLINGTON.	

LORD STANLEY OF ALDERLEY in the Chair.

Evidence on the best Mode of obtaining accurate Agricultural Statistics.

E. A. Bowring, Esq.

20th July 1855.

EDGAR A. BOWRING, Esquire, is called in, and examined as follows:

900. *Chairman.*] CAN you inform the Committee, from your experience at the Board of Trade, and of the inquiries which have been made there, as to what course has been taken in the attempts to obtain agricultural statistics in former years?

The first attempt, with a view to obtain any definite information, appears to have been made in the year 1831, under the auspices of a committee of the magistracy of the county of Norfolk, to which Sir John Boileau has called my attention. He took an especial interest in the matter, and communicated the results to the statistical section of the British Association at Cambridge, in the year 1845. The substance of the inquiry was embodied in a report made by the committee through their Chairman, Mr. Edmond Wodehouse, M. P. for the county, to the quarter sessions in October 1831. The county of Norfolk contains 680 parishes. Returns were obtained from 426, but the remaining 254 declined answering the questions which were addressed to them. The report goes on the assumption that the 426 parishes may be taken as a fair basis for calculating the results for the whole 680, and, by means of making a proportionate allowance for the remainder, arrives at a general result for the whole county. It therefore appears that, as respects more than one-third of the whole, the experiment was a failure. In the year 1832, when the statistical department of the Board of Trade was first established, Lord Auckland saw the importance and necessity of obtaining correct agricultural statistics. At the same time, he was quite aware that there would be great obstacles in the way, owing to the farmers not being at all well-disposed in the matter; and there being plenty to do in organizing the other branches of the department, he thought it better to suspend taking any steps as respects this particular subject. The next time when I find the question to have been again agitated was in the year 1836. The Board of Trade then determined itself to make the experiments, and selected the county of Bedford for the purpose—I believe, because it stood first in the list of counties in alphabetical order. A circular was addressed by the Board of Trade to the clergymen of the 126 parishes into which the county is divided, sending them Schedules of the returns required, and asking their co-operation in filling them up. The results of that inquiry were laid before Parliament in the year 1844, in the paper which I now hold in my hand, from which it appears that, out of the 126 parishes, only 27 returned any answer; therefore that experiment was necessarily abandoned. The next time the subject appears to have been mooted was in the Session of 1844, when a discussion took place in the House of Commons on the

E. A. Bowring, Esq.

20th July 1855.

18th of April: Mr. Gladstone, the then President of the Board of Trade, stated that the subject was receiving his consideration, and that the importance of it was fully admitted by the Government. Then, subsequently to that, on the 21st of November in the same year, the Board of Trade applied to the Home Office on the subject, to see whether the machinery of the Poor Law Board might not be made available for the purpose of collecting agricultural statistics: a correspondence ensued, which was also laid before Parliament in the following year, 1845. The Poor Law Board pointed out the difficulties in the way of their being employed in any general collection of agricultural statistics, inasmuch as, even as respects England and Wales, they had no power whatever in the case of the Gilbert unions and districts not under their authority; while, as respects the whole of Scotland and Ireland, they were entirely without power of any kind: they made an estimate as to the probable expense, and they computed it for the 623 unions of England and Wales, at from 15*l.* to 20*l.* per annum, making a total of, in round numbers, 10,000*l.* However, in 1845, the Board of Trade undertook the collection of agricultural statistics on a small scale in the three countries simultaneously. In the case of Ireland, Sir John, then Mr. Young, who was, I believe, at that time Secretary to the Treasury, took a great deal of interest in the matter; and he employed a private individual in the Bailieborough union to collect the agricultural statistics of the union, and with great success. In the case of Scotland, the county of Mid-Lothian was selected for the experiment; and on the 18th of November 1845, a circular was addressed by the Board of Trade, through the Queen's Remembrancer at Edinburgh, to the schoolmasters of the parishes of that county, enclosing tabular forms, which it was thought desirable to have filled up: here again the result was perfectly satisfactory; the total expense incurred was, I find, rather under 200*l.* In the case of England, North Hants was selected; and the Board of Trade addressed direct communications to the Boards of Guardians of the different unions, and the Poor Law Commissioners at the same time requested them to employ their own paid officers to induce the occupiers of land to fill up the Schedules that were sent to them: this experiment turned out unsuccessfully; I am not able to give the exact figures, but the result of the experiment was a perfect failure; and it was felt to be hopeless to proceed, as matters then stood, without compulsory powers.

901. Was any return made to Parliament of the results of that experiment?

No. The next step was, that Mr. Milner Gibson, the then Vice-President of the Board of Trade, brought in a Bill in 1847, entitled "A Bill to make Provision for the Collection of Agricultural Statistics in England and Wales," which Bill I hold in my hand, and of which I will, with the permission of the Committee, state the general contents. The duty of obtaining the information specified in the Schedule attached to the Bill was entrusted to the Registrar-general of Births, Deaths and Marriages, the Superintendent Registrars throughout the country being charged with the appointment of "agricultural enumerators" in their respective districts. Those enumerators were to make lists of all the occupiers of land exceeding three acres, and to send the specified blank forms to them, which were to be filled up and returned to the enumerators within 14 days. The latter were to classify them, and make general tables from them, which were to be returned through the Superintendent Registrars to the Registrar-general by the 10th of July in each year for the use of the Board of Trade, who were to have power to alter the forms of the returns given in the Schedules as experience might show to be advisable. Provision was made for remunerating the enumerators at the rate of 50*s.* per annum for every 100 Schedules filled up by the occupiers of land within their respective districts, and the Superintendent Registrars at the rate of 10*l.* for every 100*l.* paid to their respective enumerators, such expenses being charged to the General Register Office.

902. What progress was made with that Bill in Parliament?

I cannot find that it reached beyond the first reading; it never was read even a second time. One or two short discussions took place in the House on the subject. The importance of it was admitted by those who spoke, but there was not sufficient interest expressed to make the Government feel that there was any chance of passing the Bill; and it was accordingly abandoned.

903. Earl *Burlington.*] Was that Bill brought in by the Government?
Yes; the Bill was brought in by the Government at the time Mr. Milner Gibson was Vice-President of the Board of Trade. I see that Mr. Milner Gibson and Mr. Parker, the Secretary to the Treasury, brought it in.

904. *Chairman.*] When was the next attempt made to obtain agricultural statistics?
The next step was taken in Ireland. Very shortly after the time just spoken of, there was great apprehension of a famine in Ireland, and the Earl of Clarendon, who was then Lord Lieutenant, desired returns of this character to be collected under the direction of the Board of Works; and since that time they have been regularly continued.

905. Was the same machinery used at that time as that which has since been continued?
The same machinery has been continued, but not under the same management: it was then in the hands of the Board of Works; and now the Registrar-general is entrusted with the superintendence.

906. Was not the information at first obtained through the intervention of the police of the country?
Yes, not only as regards the acreage and stock, but also the returns of the produce of the harvest; and all these returns have been regularly continued since. It appears that the Highland Society first addressed their communications to Government on the subject of collecting agricultural statistics in the year 1847. They appear to have corresponded with the then Vice-President of the Board of Trade as to the best means of proceeding in the case of Scotland. The correspondence was not of an official nature.

907. Earl of *Doncaster.*] Was not the application made by the Highland Society to the Board of Trade, and not by the Board of Trade to the Highland Society?
By the Highland Society to the Board of Trade.

908. Urging upon the Board of Trade the advantages of collecting such statistics?
Yes, in an unofficial way; that was eight years ago. It appears that the proposition of the Society then was, to provide for the expense of the measure by a parochial assessment to be raised with the poor-rate; and it was afterwards proposed to levy it with the land-tax.

909. *Chairman.*] Was not an attempt made in Scotland, in 1849, to obtain this information through their own machinery, without any assistance from the Government?
I have an instance of an experiment of that kind; it was carried out by the East Berwickshire Farmers' Club, which collected the agricultural statistics of that county in a very satisfactory way, and at an absolutely nominal expense.

910. Does that conclude the attempts which have been made, either by private individuals or associations, or by the assistance of the Government, to obtain agricultural statistics?
All that has since taken place will, I believe, be found fully detailed in the documents before the Committee

911. Can you state what machinery was used to collect the statistics in Berwickshire?
It was done through the rural police of the county, the superintendent of that body having offered his assistance in the matter. In a letter addressed by Mr. Milne to Sir William Craig, it is stated that the required information was obtained from nearly every parish in the county, and at an expense not exceeding 5*l.* I hold in my hand a specimen of the form employed in the inquiry. The next step in the matter appears to have been taken in the year 1852. On the 13th of January in that year the Highland Society, through its then President, the Duke of Roxburgh, repeated the application which had been formerly made to the Board of Trade in 1847: from that date the Secretary of the Highland Society has made your Lordships acquainted with the history of the experiments in Scotland.

E. A. Bowring, Esq.

20th July 1855.

912. Then commenced the attempt of 1853 through the Board of Trade?
Yes; negotiations went on through the year 1852, interrupted by two changes of Government; and eventually, in 1853, the experiment was started, the results of which are before the Committee.

913. It was then tried in the three counties of Haddington, Roxburgh, Sutherland?
Yes.

914. The machinery employed in the collection of those returns is the same as that which has been employed since?
Yes.

915. Earl of *Doncaster*.] Was not the experiment of 1853 tried after urgent representations on the part of the Highland Society, and interviews of deputations of the Highland Society with the President of the Board of Trade?
Yes; such interviews took place in the month of June 1852, Mr. Henley being at that time President; and again early in 1853, when Mr. Cardwell was President.

916. Lord *Portman*.] Are you aware whether the Royal Agricultural Society of England at any time have made any communication to the Board of Trade upon this subject?
At the meeting held in the beginning of the year 1853, at the Board of Trade, to discuss the subject with Mr. Cardwell, Lord Stanley and Mr. Baines, the Duke of Buccleugh and Mr. Hall Maxwell attended as a deputation from the Highland Society, and Lord Ashburton and Mr. Hudson, the secretary, on behalf of the Royal Agricultural Society of England.

917. Are you aware of the fact that some few years before that, a deputation from the Royal Agricultural Society waited upon Lord John Russell, who was then Prime Minister, to urge the same thing?
No.

The Witness is directed to withdraw.

Ordered, That this Committee be adjourned to Monday next, Two o'clock.

APPENDIX.

Appendix A.

AGRICULTURAL STATISTICS FOR THE YEAR 1855.

COUNTY OF EDINBURGH, PARISH OF GLENCROSS.

Appendix A.

Agricultural Statistics for the Year 1855.

COUNTY OF EDINBURGH, PARISH OF GLENCROSS.

ABSTRACT.

Grain, &c.	Wheat.	Oats.	Barley.	Bere.	Rye.	Beans and Peas.	Total Number of Acres.
	82·198	581·754	157·580	- - -	- - -	- - -	821·532
Green Crops	Turnips.	Potatoes.	Mangel Wurzel.	Carrots.	Cabbages.	Vetches.	Other Green Crops.	
	262·870	62·844	- - -	- - -	- - -	3·247	- - -	328·961
Other Crops, &c. &c.	Flax.	Meadow.	Rough Pasture.	Woods.	Houses and Gardens.	Roads.	Water.	Foreshore.	
	- - -	- - -	2474·190	461·357	63·631	91·863	51·216	- -	3142·257
						Total Area of the Parish - - -			4292·750

Abstract made by Colour-sergeant B. K. Spencer, R. S. M. Date, 3 January 1855.

N.B.—These Tables have been made to illustrate the system of collecting Agricultural Statistics which I have recommended, but the areas are only approximately correct.

Henry James, Lieut.-Col. Royal Engineers.

N.B.—To convert decimal fractions of an acre into Roods and Perches, multiply the decimal first by 4, and then by 40, preserving the same number of decimals in the products.

Examples.

633·357 acres.
4
1·428
40
A. R. P.
633 1 17·1 = 17·120

527·013 acres.
4
·052
40
A. R. P.
527 - 2 = 2·080

NAMES of the Proprietors and Tenants.

Properties.			Tenements.		
No.	Name of Property.	Name of Proprietor.	No.	Name of Farm.	Name of Tenant.
I.	Bush - - - -	Archibald Trotter, Esq. - -	1	Castlelaw - - - -	John Wilson.
			2	Bush - - - - -	Archibald Trotter, Esq.
			3	Crosshouse - - - -	Ralph Strachan.
			4	Manse - - - - -	Rev. Alex. Torens.
			5	Easter Bush - - - -	John Blackie.
			6	New Milton - - - -	William Cochrane.
			7	Milton Cottages - - -	Several Tenants.
II.	Woodhouselee - -	James Tytler, Esq. (of Woodhouselee).	1	East Howgate - - - -	William Noble.
			2	Fulford - - - - -	Robert Duncan.
			3	Woodhouselee - - - -	James Tytler, Esq.
			4	Woodside - - - - -	James Watson.

NAMES of the Proprietors and Tenants—*continued.*

PROPERTIES.			TENEMENTS.		
No.	Name of Property.	Name of Proprietor.	No.	Name of Farm.	Name of Tenant.
III.	East Bush	Mrs. Colonel Wilkie (Edinburgh)	1	East Bush	Doctor John Walker.
			2	„	James Stedman (of Boghall).
IV.	House of Muir	James Inglis, Esq., Dean of Faculty (Edinburgh).	1	House of Muir	John Wilson.
			2	Flotterstone Bridge (a Feu)	George Graham (Feuer).
V.	Water Company, Edinburgh.		–	Grass of property, let yearly.	—
VI.	Glencross	Andrew Melrose, Esq., Chapel-street, Edinburgh.	1	Glencross Mains	Mich. Fox.
			2	Glencross House	General Jessborough. Grant Faulkner.
VII.	Loganbank	Sir Harry Maxwell Inglis, Bart., of Loganbank.	1	Loganbank	Sir Harry Maxwell Inglis, Bart.
			2	Milton Mill	Matthew Freir.
			3	Lawrencelaw Cottage	Peter Brown.
			4	Milton Cottage (a Feu)	Robert Clarke (Feuer).
			5	Loganbrae Cottage (a Feu)	William Merrilaws (Feuer).
			6	Loganlee Post-office (a Feu)	William Thorburn (Feuer).
			7	Smithy (a Feu)	Charles Lawson (Feuer) (Penicuick).
			8	Fisher's Tryst (a Feu)	John Dick (Feuer).
			9	Auchindinny (a Feu)	William Forbes (Feuer).
			10	„	Several Tenants.
			11	„	In the Proprietor's hands.
VIII.	Whinnyhaugh	John Hall, Esq.	1		Matthew Freir.
IX.	Part of Lee	Sir Norman Lockhart, of Lee	1		William Cochrane, of New Milton.
			2		John Cochrane, of Roslin.
X.	Old Woodhouselee	Robert Brown, Esq., of Firth	1	Old Woodhouselee	John Cochrane, of Roslin.
			2	Auchindinny (a Feu)	Misses Noble, of Stobbs, Peeblesshire (Feuers).
			3	– – – (a Feu)	James Lamb, of Bonnyrig (Feuer).
			4	Old Woodhouselee	Robt. Brown, Esq.
XI.	Greenlaw	Sir Geo. Clark, Bart., Penicuick House.	1	Lawhead	James Ballantyne.
			2	Marchwell	Janet Hunter.
			3	Cuiken	William Ainslie.
			4		John Hill, of Penicuick.
			5		John Wilson, of Eastfield.
			6	Greenlaw Mains	Arch. Trotter, Esq., Bush.
			7	Wood	In Proprietor's hands.
XII.	Mauricewood	David Dixon, Esq., Stationer, Edinburgh.	1	Mauricewood Mains	John Hedman.
			2	Parish School	John Stewart.
			3	Mauricewood	David Dixon, Esq.
XIII.	Bellwood	Lady Sempill, Bellwood	1	Bellwood	James Alexander, Beeslack.
			2	Bellwood House	Lady Sempill.
XIV.	Greenlaw	Board of Ordnance		Pathhead House	William Forbes.
				Greenlaw Prison	Board of Ordnance.
XV.	Sunnyside	William Cochrane, New Milton	–	Sunnyside	Not at present occupied.
XVI.	Dalmore Mill	Hugh Somerville, Esq., Auchindinny House.	–	Dalmore Mill	Hugh Somerville, Esq.
XVII.	Beeslack	Chas. Cowan, Esq., M.P., Penicuick.	1	Beeslack	James Alexander.
			2	Eastfield	Thomas Symington.
XVIII.	Bush Loan Turnpike	Road Trustees.	–	Bush Loan Turnpike	Gideon Torens.

SUMMARY OF AGRICULTURAL STATISTICS FOR THE YEAR 1855. - - - -

Reference Number on Plans.			Area in Acres.	CORN, BEANS, AND PEAS.						GREEN CROPS.						
Properties.	Tenements.	Inclosures.		Wheat.	Oats.	Barley.	Bere.	Rye.	Beans and Peas.	Turnips.	Potatoes.	Mangel Wurzel.	Carrots and Parsnips.	Cabbages.	Vetches.	Other Green Crops.
I.	1	1 to 16	735·499	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
	2	17 to 36	164·351	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
	3	37 to 56	141·502	4·875	35·861	23·484	- -	- -	- -	17·184	5·110	- -	- -	- -	- -	- -
	4	57 to 60	10·749	- -	- -	3·241	- -	- -	- -	1·481	- -	- -	- -	- -	- -	- -
	5	61 to 80	77·357	3·500	12·487	4·500	- -	- -	- -	8·250	1·650	- -	- -	- -	- -	- -
	6	81 to 91	97·744	4·900	25·080	10·482	- -	- -	- -	0·800	8·305	- -	- -	- -	- -	- -
	7	92 - -	1·843	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
			1229·045	13·275	73·428	41·707	- -	- -	- -	27·715	15·065	- -	- -	- -	- -	- -
II.	1	93 to 120	285·076	4·530	45·936	9·127	- -	- -	- -	14·996	4·000	- -	- -	- -	- -	- -
	2	121 to 144	216·976	10·190	41·941	13·357	- -	- -	- -	22·544	11·000	- -	- -	- -	- -	- -
	3	145 to 158	35·869	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
	4	159 to 161	17·897	- -	3·000	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
			555·818	14·720	90·877	22·484	- -	- -	- -	37·540	15·000	- -	- -	- -	- -	- -
III.	1	162 to 168	17·738	- -	8·379	- -	- -	- -	- -	0·875	- -	- -	- -	- -	- -	- -
	2	169 to 176	40·306	- -	24·757	- -	- -	- -	- -	11·788	- -	- -	- -	- -	- -	- -
			58·044	- -	33·136	- -	- -	- -	- -	12·663	- -	- -	- -	- -	- -	- -
IV.	1	177 to 214	761·523	- -	48·222	9·000	- -	- -	- -	28·484	6·500	- -	- -	- -	- -	- -
	2	215 - -	0·356	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
			761·879	- -	48·222	9·000	- -	- -	- -	28·484	6·500	- -	- -	- -	- -	- -
V.	- -	216 to 242	85·507	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
VI.	1	243 to 283	260·158	20·063	38·968	22·819	- -	- -	- -	37·534	- -	- -	- -	- -	- -	- -
	2	284 to 290	18·620	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
			278·778	20·063	38·968	22·819	- -	- -	- -	37·534	- -	- -	- -	- -	- -	- -
VII.	1	291 to 307	48·799	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
	2	308 to 319	46·665	- -	17·143	- -	- -	- -	- -	7·961	- -	- -	- -	- -	- -	- -
	3	320 to 336	54·623	15·311	6·383	4·092	- -	- -	- -	10·031	2·100	- -	- -	- -	- -	- -
	4	337 - -	0·387	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
	5	338 - -	0·204	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
	6	339 - -	0·428	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
	7	340 - -	0·428	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
	8	341 - -	0·296	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
	9	342 and 343	1·755	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
	10	344 to 347	1·188	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
	11	348 to 350	2·364	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
			157·137	15·311	23·526	4·092	- -	- -	- -	17·992	2·100	- -	- -	- -	- -	- -
VIII.	- -	351 to 360	28·659	- -	12·714	- -	- -	- -	- -	1·852	1·100	- -	- -	- -	- -	- -
IX.	1	361 - -	2·922	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
	2	362 to 364	17·886	- -	10·903	- -	- -	- -	- -	- -	- -	- -	- -	- -	3·247	- -
			20·808	- -	10·903	- -	- -	- -	- -	- -	- -	- -	- -	- -	3·247	- -
X.	1	365 to 371	83·231	9·600	29·315	19·500	- -	- -	- -	7·660	- -	- -	- -	- -	- -	- -
	2	372 - -	0·265	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
	3	373 - -	0·377	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
	4	374 to 384	38·033	5·029	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
			121·906	14·629	29·315	19·500	- -	- -	- -	7·660	- -	- -	- -	- -	- -	- -
XI.	1	385 to 401	236·822	- -	70·279	- -	- -	- -	- -	35·073	4·875	- -	- -	- -	- -	- -
	2	402 to 407	33·729	- -	7·595	- -	- -	- -	- -	4·500	3·500	- -	- -	- -	- -	- -
	3	408 to 429	229·015	4·200	59·120	14·578	- -	- -	- -	22·000	6·739	- -	- -	- -	- -	- -
	4	430 and 431	10·139	- -	5·792	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
	5	432 - -	13·733	- -	13·733	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
	6	433 to 445	124·995	- -	40·289	15·400	- -	- -	- -	15·412	3·665	- -	- -	- -	- -	- -
	7	446 to 448	36·750	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
			685·183	4·200	196·808	29·978	- -	- -	- -	76·985	18·779	- -	- -	- -	- -	- -
XII.	1	449 to 454	39·967	- -	11·792	- -	- -	- -	- -	7·462	- -	- -	- -	- -	- -	- -
	2	455 - -	0·519	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
	3	456 to 463	24·423	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
			64·909	- -	11·792	- -	- -	- -	- -	7·462	- -	- -	- -	- -	- -	- -
XIII.	1	464 to 477	44·557	- -	2·565	- -	- -	- -	- -	0·983	- -	- -	- -	- -	- -	- -
	2	478 - -	0·148	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
			44·705	- -	2·565	- -	- -	- -	- -	0·983	- -	- -	- -	- -	- -	- -
XIV.	1	479 to 486	37·670	- -	- -	4·500	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
	2	487 - -	15·687	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
			53·357	- -	- -	4·500	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
XV.	- -	488 - -	0·244	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
XVI.	- -	489 to 499	12·277	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
XVII.	1	500 to 508	52·229	- -	9·500	3·500	- -	- -	- -	6·000	4·300	- -	- -	- -	- -	- -
	2	509 and 510	8·100	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
			60·329	- -	9·500	3·500	- -	- -	- -	6·000	4·300	- -	- -	- -	- -	- -
XVIII.	- -	511 - -	0·117	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Public Roads		512 to 531	74·048	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
		TOTAL -	4292·750	82·198	581·754	157·580	- -	- -	- -	262·870	62·944	- -	- -	- -	3·247	- -

SUMMARY OF AGRICULTURAL STATISTICS FOR THE YEAR 1855.

Flax.	Meadow and Clover.	Rough Pasture, and Mountain.	Woods and Plantation.	Houses and Gardens.	Roads.	Water.	Foreshore.	Page of Return.	NAME of TENEMENT.	NAME of PROPERTY.
- -	- -	732·722	0·533	1·061	- - -	0·283	- -	6	Castlelaw - - -	Bush.
- -	- -	90·699	69·102	4·112	0·438	- - -	- -	6	Bush - - - -	
- -	- -	41·157	13·297	0·534	- - -	- - -	- -	7	Crosshouse - - -	
- -	- -	5·498	- - -	0·529	- - -	- - -	- -	7	Manse - - - -	
- -	- -	25·660	19·711	0·550	1·049	- - -	- -	7	Easter Bush - - -	
- -	- -	47·031	- - -	1·024	- - -	0·122	- -	8	New Milton - - -	
- -	- -	- - -	- - -	1·843	- - -	- - -	- -	8	Milton Cottages -	
- -	- -	942·767	102·643	10·553	1·487	0·405	- -			
- -	- -	177·529	22·150	2·990	3·818	- - -	- -	8	East Howgate - -	Woodhouselee.
- -	- -	99·712	15·965	2·267	- - -	- - -	- -	9	Fulford - - -	
- -	- -	16·681	15·934	1·698	1·383	0·173	- -	9	Woodhouselee - -	
- -	- -	13·584	1·313	- - -	- - -	- - -	- -	9	Woodside - - -	
- -	- -	307·506	55·362	6·955	5·201	0·173	- -			
- -	- -	5·782	1·028	1·405	0·269	- - -	- -	10	East Bush - - -	East Bush.
- -	- -	- - -	3·496	- - -	0·265	- - -	- -	10	,, - - -	
- -	- -	5·782	4·524	1·405	0·534	- -	- -			
- -	- -	618·649	45·699	2·031	1·568	1·370	- -	11	House of Muir - -	House of Muir.
- -	- -	- - -	- - -	0·356	- - -	- - -	- -	11	Flotterstone Bridge -	
- -	- -	618·649	45·699	2·387	1·568	1·370	- -			
- -	- -	22·215	25·717	0·588	- - -	36·987	- -	11	No distinctive name -	- - Water Company's property.
- -	- -	75·105	57·625	2·644	3·349	2·051	- -	12	Glencross Mains - -	Glencross.
- -	- -	13·672	2·708	2·240	- - -	- - -	- -	12	Glencross House - -	
- -	- -	88·777	60·333	4·884	3·349	2·051	- -			
- -	- -	33·129	13·322	1·309	- - -	1·039	- -	13	Loganbank - - -	Loganbank.
- -	- -	19·614	0·288	1·598	- - -	0·061	- -	13	Milton Mill - - -	
- -	- -	9·793	5·884	0·774	- - -	0·255	- -	13	Lawrencelaw Cottage -	
- -	- -	- - -	- - -	0·387	- - -	- - -	- -	14	Milton Cottage - -	
- -	- -	- - -	- - -	0·204	- - -	- - -	- -	14	Loganbrae Cottage -	
- -	- -	- - -	- - -	0·428	- - -	- - -	- -	14	Loganlee Post-office -	
- -	- -	- - -	- - -	0·428	- - -	- - -	- -	14	Smithy - - - -	
- -	- -	- - -	- - -	0·296	- - -	- - -	- -	14	Fisher's Tryst - -	
- -	- -	- - -	- - -	1·755	- - -	- - -	- -	14	Auchindinny - -	
- -	- -	- - -	- - -	1·188	- - -	- - -	- -	14	,, - - -	
- -	- -	1·136	0·743	- - -	- - -	0·485	- -	14	No distinctive name -	
- -	- -	63·672	20·237	8·367	- - -	1·840	- -			
- -	- -	10·374	1·615	0·200	- - -	0·804	- -	15	Whinnyhaugh - -	Whinnyhaugh.
- -	- -	2·922	- - -	- - -	- - -	- - -	- -	15	No distinctive name -	Part of Lee.
- -	- -	3·736	- - -	- - -	- - -	- - -	- -	15	,, - - -	
- -	- -	6·658	- - -	- - -	- - -	- - -	- -			
- -	- -	16·661	- - -	0·495	- - -	- - -	- -	15	Old Woodhouselee -	Old Woodhouselee.
- -	- -	- - -	- - -	0·265	- - -	- - -	- -	15	Auchindinny - -	
- -	- -	- - -	- - -	0·377	- - -	- - -	- -	15	,, - - -	
- -	- -	5·950	24·300	- - -	- - -	2·754	- -	15	Old Woodhouselee -	
- -	- -	22·611	24·300	1·137	- - -	2·754	- -			
- -	- -	118·115	5·202	1·843	1·099	0·336	- -	16	Lawhead - - -	Greenlaw.
- -	- -	17·734	- - -	0·400	- - -	- - -	- -	16	Marchwell - - -	
- -	- -	103·304	12·247	2·083	4·577	0·167	- -	17	Cuiken - - -	
- -	- -	4·347	- - -	- - -	- - -	- - -	- -	17	,, - - - -	
- -	- -	- - -	- - -	- - -	- - -	- - -	- -	17	,, - - - -	
- -	- -	46·709	2·229	1·201	- - -	- - -	- -	17	Greenlaw Mains -	
- -	- -	- - -	36·750	- - -	- - -	- - -	- -	17	Wood - - - -	
- -	- -	290·209	56·428	5·527	5·676	0·503	- -			
- -	- -	20·387	- - -	0·326	- - -	- - -	- -	17	Mauricewood Mains -	Mauricewood.
- -	- -	- - -	- - -	0·519	- - -	- - -	- -	17	Parish School - -	
- -	- -	1·069	22·133	1·191	- - -	0·030	- -	18	Mauricewood - -	
- -	- -	21·456	22·133	2·036	- - -	0·030	- -			
- -	- -	15·075	25·592	0·342	- - -	- - -	- -	18	Bellwood - - -	Bellwood.
- -	- -	- - -	- - -	0·148	- - -	- - -	- -	18	Bellwood House - -	
- -	- -	15.075	25·592	0·490	- - -	- - -	- -			
- -	- -	31·045	- - -	1·130	- - -	0·995	- -	18	Pathhead House - -	Greenlaw.
- -	- -	- - -	- - -	15·687	- - -	- - -	- -	18	Greenlaw Prison - -	
- -	- -	31·045	- - -	16·817	- - -	0·995	- -			
- -	- -	- - -	- - -	0·244	- - -	- - -	- -	19	Sunnyside - - -	Sunnyside.
- -	- -	6·804	1·161	1·568	- - -	2·744	- -	19	Dalmore Mill - -	Dalmore Mill.
- -	- -	12·400	15·613	0·356	- - -	0·560	- -	19	Beeslack - - -	Beeslack.
- -	- -	8·100	- - -	- - -	- - -	- - -	- -	19	Eastfield - - -	
- -	- -	20·500	15·613	0·356	- - -	0·560	- -			
- -	- -	- - -	- - -	6·117	- - -	- - -	- -	19	Bush Loan - - -	Bush Loan.
- -	- -	- - -	- - -	- - -	- - -	- - -	- -	19	- - Public Roads.	
- -	- -	2474·190	461·357	63·631	91·863	51·216	—			

COUNTY OF EDINBURGH, PARISH OF GLENCROSS.—AGRICULTURAL STATISTICS FOR THE YEAR 1855.

Reference Number on Plans.			Area in Acres.	CORN, BEANS, AND PEAS.						GREEN CROPS.							Flax.	Meadow and Clover.	Rough Pasture and Mountain.	Woods and Plantation.	Houses and Gardens.	Roads.	Water.	Foreshore.	REMARKS.
Properties.	Tenements.	Inclosures.		Wheat.	Oats.	Barley.	Bere.	Rye.	Beans and Peas.	Turnips.	Potatoes.	Mangel Wurzel.	Carrots and Parsnips.	Cabbages.	Vetches.	Other Green Crops.									
I.	1	1	15·834	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	15 834	–	–	–	–	–	
		2	16·400	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	16·400	–	–	–	–	–	
		3	495·579	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	495·579	–	–	–	–	–	
		4	138·970	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	138·970	–	–	–	–	–	
		5	0·098	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·098	–	
		6	14·368	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	14·368	–	–	–	–	–	
		7	2·962	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2·962	–	–	–	–	–	
		8	1·961	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1 961	–	–	–	
		9	8·785	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	8·785	–	–	–	–	–	
		10	8·500	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	8·500	–	–	–	–	–	
		11	9·976	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	9·976	–	–	–	–	–	
		12	2·749	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2·749	–	–	–	–	–	
		13	2·657	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2·657	–	–	–	–	–	
		14	15·942	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	15·942	–	–	–	–	–	
		15	0 185	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0 185	–	
		16	0·533	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·533	–	–	–	–	
			735·499	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	732·722	0·533	1·961	–	0·283	–	Castlelaw.
	2	17	0·588	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·588	–	–	–	
		18	1·303	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·303	–	–	–	–	
		19	7·492	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	7·492	–	–	–	–	–	
		20	4·740	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	4·725	–	0 015	–	–	–	
		21	0·397	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·397	–	–	–	–	
		22	12·507	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	12 507	–	–	–	–	
		23	0·737	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·737	–	–	–	–	
		24	8·168	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	8·168	–	–	–	–	–	
		25	49·953	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	49·953	–	–	–	–	–	
		26	3·082	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3·082	–	–	–	
		27	2·107	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2·107	–	–	–	–	
		28	49·799	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	49·799	–	–	–	–	
		29	0·438	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·438	–	–	
		30	1·468	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·468	–	–	–	–	
		31	14·680	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	14·680	–	–	–	–	–	
		32	4·856	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	4·856	–	–	–	–	–	
		33	0·825	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·825	–	–	–	–	–	
		34	0·234	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·234	–	–	–	
		35	0·193	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·193	–	–	–	
		36	0·784	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·784	–	–	–	–	
			164·351	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	90·699	69·102	4·112	0·438	–	–	Bush.

3	37	12·257	–	12·257	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
	38	2·728	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2·728	–	–	–	–	
	39	10·272	–	–	–	–	–	–	–	–	–	–	–	–	–	–	10·272	–	–	–	–	–	
	40	1·187	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·187	–	–	–	–	
	41	17·184	–	–	–	–	–	17·184	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
	42	42·385	–	11·500	–	–	–	–	–	–	–	–	–	–	–	–	30·885	–	–	–	–	–	
	43	10·817	–	–	10·817	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
	44	1·354	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·354	–	–	–	–	
	45	8·948	–	8·948	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
	46	0·882	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·867	0·015	–	–	–	
	47	0 468	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·468	–	–	–	–	
	48	8·083	–	–	8·083	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
	49	1·420	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·420	–	–	–	–	
	50	9·459	4·875	–	4·584	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
	51	0·784	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·784	–	–	–	–	
	52	3·288	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3·288	–	–	–	–	
	53	1·201	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·201	–	–	–	–	
	54	5·110	–	–	–	–	–	–	5·110	–	–	–	–	–	–	–	–	–	–	–	–	–	
	55	0·519	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·519	–	–	–	
	56	3·156	–	3·156	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
		141·502	4·875	35·861	23·484	–	–	–	17·184	5·110	–	–	–	–	–	–	–	41·157	13·297	0·534	–	–	–	Crosshouse.
4	57	2·962	–	–	1·481	–	–	–	1·481	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
	58	3·410	–	–	1·760	–	–	–	–	–	–	–	–	–	–	–	–	1·650	–	–	–	–	–	
	59	0·529	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·529	–	–	–	
	60	3·848	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3·848	–	–	–	–	–	
		10·749	–	–	3·241	–	–	–	1·481	–	–	–	–	–	–	–	–	5·498	–	0·529	–	–	–	The Manse.
5	61	0·570	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·570	–	–	–	–	–	
	62	0·753	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·753	–	–	–	–	
	63	0·550	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·550	–	–	–	
	64	2·881	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2·881	–	–	–	–	–	
	65	3·522	–	3·522	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
	66	0·244	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·244	–	–	–	–	
	67	0·244	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·244	–	–	–	–	
	68	9·372	–	6·072	–	–	–	1·650	1·650	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
	69	0·330	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·330	–	–	–	–	
	70	13·254	–	–	–	–	–	6 600	–	–	–	–	–	–	–	–	–	6·654	–	–	–	–	–	
	71	5 670	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	5·670	–	–	–	–	
	72	15·555	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	15·555	–	–	–	–	–	
	73	1·486	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·486	–	–	–	–	
	74	1·049	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·049	–	–	
	75	0·967	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·967	–	–	–	–	
	76	7·466	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	7·466	–	–	–	–	
	77	0·566	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·566	–	–	–	–	
	78	1·191	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·191	–	–	–	–	
	79	0·794	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·794	–	–	–	–	
	80	10·893	3·509	2·893	4·500	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
		77·357	3·500	12·487	4·500	–	–	–	8·250	1·650	–	–	–	–	–	–	–	25·660	19·711	0·550	1·049	–	–	Easter Bush. (*continued*)

COUNTY of EDINBURGH, PARISH of GLENCROSS.—AGRICULTURAL STATISTICS for the Year 1855—*continued.*

Reference Number on Plans.			Area in Acres.	CORN, BEANS, AND PEAS.						GREEN CROPS.							Flax.	Meadow and Clover.	Rough Pasture and Mountain.	Woods and Plantation.	Houses and Gardens.	Roads.	Water.	Foreshore.	REMARKS.
Properties.	Tenements.	Inclosures.		Wheat.	Oats.	Barley.	Bere.	Rye.	Beans and Peas.	Turnips.	Potatoes.	Mangel Wurzel.	Carrots and Parsnips.	Cabbages.	Vetches.	Other Green Crops.									
I. (*contd*)	6	81	4·882	–	–	4·882	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·024	–	–	–	
		82	1·024	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
		83	16·797	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	16·797	–	–	–	–	–	
		84	11·391	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	11·391	–	–	–	–	–	
		85	0·122	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·122	–	
		86	2 769	–	–	–	–	–	–	0·800	–	–	–	–	–	–	–	–	1·969	–	–	–	–	–	
		87	6·760	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	6·760	–	–	–	–	–	
		88	12·491	–	12·491	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
		89	20·614	4·900	–	5·600	–	–	–	–	–	–	–	–	–	–	–	–	10·114	–	–	–	–	–	
		90	8·305	–	–	–	–	–	–	–	8·305	–	–	–	–	–	–	–	–	–	–	–	–	–	
		91	12·589	–	12·589	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
			97·744	4·900	25·080	10·482	–	–	–	0·800	8·305	–	–	–	–	–	–	–	47·031	–	1·024	–	0·122	–	New Milton.
	7	92	1·843	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·843	–	–	–	Milton Cottages.
II.	1	93	92·525	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	92·525	–	–	–	–	–	
		94	4·897	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	4·897	–	–	–	–	
		95	2·260	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2·260	–	–	–	–	–	
		96	10·699	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	10·699	–	–	–	–	–	
		97	6·434	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	6·434	–	–	–	–	–	
		98	12·165	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	12·165	–	–	–	–	
		99	0·947	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·947	–	–	–	–	–	
		100	9·702	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	9·702	–	–	–	–	–	
		101	1·252	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·252	–	–	–	–	
		102	24·446	–	11·446	–	–	–	–	–	–	–	–	–	–	–	–	–	13·000	–	–	–	–	–	
		103	1·792	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·792	–	–	
		104	5·725	–	5·725	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
		105	5·202	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	5·202	–	–	–	–	–	
		106	5·244	–	5·244	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
		107	4·530	4·530	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
		108	2·020	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2·020	–	–	–	–	
		109	4·052	–	–	–	–	–	–	4·052	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
		110	6·566	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	6·566	–	–	–	–	–	
		111	2·776	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2·776	–	–	–	
		112	7·604	–	7·604	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
		113	0·214	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·214	–	–	–	
		114	9·117	–	9·117	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
		115	6·285	–	–	–	–	–	–	6·285	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
		116	8·659	–	–	–	–	–	–	4·659	4,000	–	–	–	–	–	–	–	–	–	–	–	–	–	
		117	24·727	–	6·800	9·127	–	–	–	–	–	–	–	–	–	–	–	–	8·800	–	–	–	–	–	
		118	2·026	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2·026	–	–	
		119	21·394	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	21·394	–	–	–	–	–	
		120	1·816	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·816	–	–	–	–	
			285·076	4·530	45·936	9·127	–	–	–	14·996	4·000	–	–	–	–	–	–	–	177·529	22·150	2·990	3·818	–	–	East Howgate.

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COUNTY of EDINBURGH, PARISH of GLENCROSS.—AGRICULTURAL STATISTICS for the Year 1855—*continued.*

Reference Number on Plans.			Area	CORN, BEANS, AND PEAS.						GREEN CROPS.															
Properties.	Tenements.	Inclosures.	in Acres.	Wheat.	Oats.	Barley.	Bere.	Rye.	Beans and Peas.	Turnips.	Potatoes.	Mangel Wurzel.	Carrots and Parsnips.	Cabbages.	Vetches.	Other Green Crops.	Flax.	Meadow and Clover.	Rough Pasture and Mountain.	Woods and Plantation.	Houses and Gardens.	Roads.	Water.	Foreshore.	REMARKS.
III.	1	162	1·028	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·028	–	–	–	–	
		163	9·254	–	8·379	–	–	–	–	0·875	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
		164	0·794	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·794	–	–	–	
		165	0·611	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·611	–	–	–	
		166	0·682	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·682	–	–	–	–	–	
		167	5·100	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	5·100	–	–	–	–	–	
		168	0·269	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·269	–	–	
			17·738	–	8·397	–	–	–	–	0·875	–	–	–	–	–	–	–	–	5·782	1·028	1·405	0·269	–	–	East Bush.
	2	169	2·763	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2·763	–	–	–	–	
		170	11·788	–	–	–	–	–	–	11·788	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
		171	0·733	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·733	–	–	–	–	
		172	9·793	–	9·793	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
		173	6·047	–	6·047	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
		174	6·067	–	6·067	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
		175	2·850	–	2·850	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
		176	0·265	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·265	–	–	
			40·306	–	24·757	–	–	–	–	11·788	–	–	–	–	–	–	–	–	–	3·496	–	0·265	–	–	East Bush (No. 2).
IV.	1	177	1·812	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·812	–	–	–	–	
		178	5·868	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	5·868	–	–	–	–	–	
		179	0·611	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·611	–	
		180	3·980	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3·980	–	–	–	–	–	
		181	2·301	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2·301	–	–	–	–	–	
		182	2·724	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2·724	–	–	–	–	
		183	0·678	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·678	–	
		184	6·892	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	6·892	–	–	–	–	
		185	5·599	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	5·599	–	–	–	–	
		186	40·227	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	40·227	–	–	–	–	–	
		187	4·754	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	4·754	–	–	–	–	–	
		188	22·355	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	22·355	–	–	–	–	–	
		189	1·568	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·568	–	–	
		190	15·484	–	–	–	–	–	–	8·984	6·500	–	–	–	–	–	–	–	–	–	–	–	–	–	
		191	6·525	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	6·525	–	–	–	–	–	
		192	0·814	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·814	–	–	–	–	
		193	2·657	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2·657	–	–	–	–	
		194	463·655	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	463·655	–	–	–	–	–	
		195	16·512	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	16·512	–	–	–	–	
		196	45·402	–	–	–	–	–	–	19·500	–	–	–	–	–	–	–	–	25·902	–	–	–	–	–	
		197	0·377	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·37	–	–	–	
		198	2·250	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2·250	–	–	–	–	–	
		199	32·810	–	23·810	9·000	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
		200	0·698	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0 698	–	–	–	–	
		201	2·688	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2·688	–	–	–	–	

		202	9·457	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	9·457	–	–	–	–	–	
		203	0·081	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·081	–	
		204	4·795	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	4·795	–	–	–	–	–	
		205	1·171	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·171	–	–	–	
		206	7·910	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	7·910	–	–	–	–	–	
		207	10·923	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	10·923	–	–	–	–	–	
		208	0·265	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·265	–	–	–	
		209	24·412	–	24·412	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
		210	1·038	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·038	–	–	–	–	
		211	1·211	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·211	–	–	–	–	
		212	3·054	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3·054	–	–	–	–	
		213	7·747	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	7 747	–	–	–	–	–	
		214	0·218	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·218	–	–	–	
			761·523	–	48·222	9·000	–	–	–	28·484	6·500	–	–	–	–	–	–	–	618·649	45·699	2·031	1·568	1·370	–	House of Muir.
	2	215	0·356	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·356	–	–	–	Flotterstone Bridge.
V.	– –	216	35·158	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	35·158	–	
		217	0·941	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·941	–	–	–	–	
		218	2·352	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2·352	–	–	–	–	
		219	1·863	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·863	–	–	–	–	–	
		220	0·407	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·407	–	–	–	–	–	
		221	0·326	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·326	–	–	–	–	
		222	1·079	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·079	–	–	–	–	–	
		223	7·949	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	7·949	–	–	–	–	
		224	1·639	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·639	–	–	–	–	
		225	0·122	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·122	–	–	–	
		226	1·531	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·531	–	–	–	–	
		227	1·059	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·059	–	
		228	5·135	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	5·135	–	–	–	–	
		229	0·244	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·244	–	
		230	0·265	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·265	–	
		231	0·261	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·261	–	
		232	0·566	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·566	–	–	–	–	–	
		233	2·692	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2·692	–	–	–	–	
		234	1·680	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1 680	–	–	–	–	–	
		235	1·751	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·751	–	–	–	–	–	
		236	0·234	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0 234	–	–	–	–	
		237	0·953	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·953	–	–	–	–	
		238	1·965	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·965	–	–	–	–	
		239	0·177	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·177	–	–	–	
		240	5·839	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	5·839	–	–	–	–	–	
		241	0·289	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·289	–	–	–	
		242	9·030	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	9·030	–	–	–	–	–	
			85·507	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	22·215	25·717	0·588	–	36·987	–	Water Company's property.
VI.	1	243	0·702	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·702	–	
		244	0·326	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·326	–	
		245	0·738	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·738	–	
		246	1·568	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·568	–	–	–	–	–	
		247	12·033	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	12·033	–	–	–	–	–	
		248	15·457	8·000	–	7·457	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
		249	10·831	–	10·831	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
		250	8·816	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	8·816	–	–	–	–	–	
Carried forward	– –		50·471	8·000	10·831	7·457	–	–	–	–	–	–	–	–	–	–	–	–	22 417	–	–	–	1·766	–	

(continued)

COUNTY of EDINBURGH, PARISH of GLENCROSS.—AGRICULTURAL STATISTICS for the Year 1855—*continued.*

Reference Number on Plans.			Area in Acres.	CORN, BEANS, AND PEAS.						GREEN CROPS.															REMARKS.
Properties.	Tenements.	Inclosures.		Wheat.	Oats.	Barley.	Bere.	Rye.	Beans and Peas.	Turnips.	Potatoes.	Mangel Wurzel.	Carrots and Parsnips.	Cabbages.	Vetches.	Other Green Crops.	Flax.	Meadow and Clover.	Rough Pasture and Mountain.	Woods and Plantation.	Houses and Gardens.	Roads.	Water.	Foreshore.	
		Brought forward -	50·471	8·000	10·831	7·457	–	–	–	–	–	–	–	–	–	–	–	–	22·417	–	–	–	1·766	–	
VI. (*contd*)	1	251	7·319	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	7·319	–	–	–	–	
		252	16·390	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	16·390	–	–	–	–	–	
		253	7·380	–	7·380	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
		254	0·835	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·835	–	–	–	–	–	
		255	2·321	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2·321	–	–	–	–	
		256	5·680	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	5·680	–	–	–	–	
		257	8·714	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	8·714	–	–	–	–	
		258	2·830	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2·830	–	–	
		259	15·362	–	–	15·362	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
		260	13·458	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	13·458	–	–	–	–	
		261	11·055	–	11·055	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
		262	9·702	–	9·702	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
		263	0·265	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·265	–	–	–	–	
		264	12·511	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	12·511	–	–	–	–	–	
		265	2·362	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2·362	–	–	–	–	
		266	1·771	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·771	–	–	–	–	
		267	0·387	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·387	–	–	–	–	
		268	1·110	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·110	–	–	–	–	
		269	17·245	–	–	–	–	–	–	17·245	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
		270	0·173	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·173	–	
		271	5·351	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	5·351	–	–	–	–	
		272	0·875	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·875	–	–	–	–	
		273	12·063	12·063	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
		274	0·519	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·519	–	–	
		275	1·608	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·608	–	–	–	
		276	0·112	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·112	–	
		277	0·377	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·377	–	–	–	
		278	22·952	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	22·952	–	–	–	–	–	
		279	20·289	–	–	–	–	–	–	20·289	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
		280	0·377	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·377	–	–	–	–	
		281	5·965	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	5·965	–	–	–	–	
		282	0·659	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·659	–	–	–	
		283	1·670	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·670	–	–	–	–	
			260·158	20·063	38·968	22·819	–	–	–	37·534	–	–	–	–	–	–	–	–	75·105	57·625	2·644	3·349	2·051	–	Glencross Mains.
	2	284	3·604	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3·604	–	–	–	–	–	
		285	1·435	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·435	–	–	–	
		286	0·855	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·855	–	–	–	–	
		287	0·428	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·428	–	–	–	
		288	10·068	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	10·068	–	–	–	–	–	
		289	1·853	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·853	–	–	–	–	
		290	0·377	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·377	–	–	–	
			18·620	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	13·672	2·708	2·240	–	–	–	Glencross House.

| 1 | | |

COUNTY of EDINBURGH, PARISH of GLENCROSS.—AGRICULTURAL STATISTICS for the Year 1855—*continued.*

Reference Number on Plans.			Area in Acres.	CORN, BEANS, AND PEAS.						GREEN CROPS.							Flax.	Meadow and Clover.	Rough Pasture and Mountain.	Woods and Plantation.	Houses and Gardens.	Roads.	Water.	Foreshore.	REMARKS.
Properties.	Tenements.	Inclosures.		Wheat.	Oats.	Barley.	Bere.	Rye.	Beans and Peas.	Turnips.	Potatoes.	Mangel Wurzel.	Carrots and Parsnips.	Cabbages.	Vetches.	Other Green Crops.									
VII. (*cont*d)	4	337	0·387	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·387	–	–	–	Milton Cottage.
	5	338	0·204	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·204	–	–	–	Loganbrae Cottage.
	6	339	0·428	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·428	–	–	–	Loganlee Post-office.
	7	340	0·428	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·428	–	–	–	Smithy.
	8	341	0·296	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·296	–	–	–	Fisher's Tryst.
	9	342	0·757	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·757	–	–	–	
		343	0·998	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·998	–	–	–	
			1·755	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·755	–	–	–	Auchindinny (No. 9).
	10	344	0·301	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·301	–	–	–	
		345	0·249	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·249	–	–	–	
		346	0·261	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·261	–	–	–	
		347	0·377	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·377	–	–	–	
			1·188	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·188	–	–	–	Auchindinny (No. 10).
	11	348	0·743	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·743	–	–	–	–	
		349	1·136	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·136	–	–	–	–	–	
		350	0·485	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·485	–	
			2·364	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·136	0·743	–	–	0·485	–	No. 11.—No distinctive name.

VIII.	–	–	351	7·421	–	–	–	–	–	–	–	–	–	–	–	–	–	–	7·421	–	–	–	–	–
			352	1·904	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·904	–	–	–	–	–
			353	0·499	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·499	–
			354	2·952	–	–	–	–	–	1·852	1·100	–	–	–	–	–	–	–	–	–	–	–	–	–
			355	0·200	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·200	–	–	–
			356	1·049	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·049	–	–	–	–	–
			357	12·409	–	12·409	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
			358	1·615	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·615	–	–	–	–
			359	0·305	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·305	–
			360	0·305	–	0·305	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
				28·659	–	12·714	–	–	–	1·852	1·100	–	–	–	–	–	–	–	10·374	1·615	0·200	–	0·804	–
IX.	1		361	2·922	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2·922	–	–	–	–	–
	2		362	3·247	–	–	–	–	–	–	–	–	–	–	3·247	–	–	–	–	–	–	–	–	–
			363	3·736	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3·736	–	–	–	–	–
			364	10·903	–	10·903	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
				17·886	–	10·903	–	–	–	–	–	–	–	–	3·247	–	–	–	3·736	–	–	–	–	–
X.	1		365	13·600	–	13·600	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
			366	11·300	–	–	11·300	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
			367	4·215	–	4·215	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
			368	26·823	–	11·500	–	–	–	7·660	–	–	–	–	–	–	–	–	7·663	–	–	–	–	–
			369	0·495	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·495	–	–	–
			370	23·551	9·600	–	8·200	–	–	–	–	–	–	–	–	–	–	–	5·751	–	–	–	–	–
			371	3·247	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3·247	–	–	–	–	–
				83·231	9·600	29·315	19·500	–	–	7·660	–	–	–	–	–	–	–	–	16·661	–	0·495	–	–	–
	2		372	0·265	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·265	–	–	–
	3		373	0·377	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·377	–	–	–
	4		374	11·086	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	11·086	–	–	–	–
			375	2·358	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2·358	–	–	–	–	–
			376	1·696	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·696	–	–	–	–	–
			377	0·285	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·285	–
			378	0·298	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·298	–	–	–	–	–
			379	5·029	5·029	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
			380	12·145	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	12·145	–	–	–	–
			381	0·794	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·794	–	–	–	–	–
			382	2·469	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2·469	–
			383	0·804	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·804	–	–	–	–	–
			384	1·069	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·069	–	–	–	–
				38·033	5·029	–	–	–	–	–	–	–	–	–	–	–	–	–	5·950	24·300	–	–	2·754	–

	Whinnyhaugh.
	No. 1.—No distinctive name.
	No. 2.—No distinctive name.
	Old Woodhouselee.
	Auchindinny (No. 2).
	Auchindinny (No. 3).
	Old Woodhouselee (No. 4).

COUNTY of EDINBURGH, PARISH of GLENCROSS.—AGRICULTURAL STATISTICS for the Year 1855—*continued.*

Reference Number on Plans.			Area in Acres.	CORN, BEANS, AND PEAS.						GREEN CROPS.															REMARKS.
Properties.	Tenements.	Inclosures.		Wheat.	Oats.	Barley.	Bere.	Rye.	Beans and Peas.	Turnips.	Potatoes.	Mangel Wurzel.	Carrots and Parsnips.	Cabbages.	Vetches.	Other Green Crops.	Flax.	Meadow and Clover.	Rough Pasture and Mountain.	Woods and Plantation.	Houses and Gardens.	Roads.	Water.	Foreshore.	
XI.	1	385	124·384	–	23·400	–	–	–	–	20·250	–	–	–	–	–	–	–	–	80·734	–	–	–	–	–	
		386	0·086	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·086	–	–	–	
		387	21·429	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	21·429	–	–	–	–	–	
		388	2·036	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2·036	–	–	–	–	
		389	15·229	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	15·229	–	–	–	–	–	
		390	0·336	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·336	–	
		391	0·448	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·448	–	–	–	–	–	
		392	0·275	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·275	–	–	–	–	–	
		393	20·360	–	20·360	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
		394	1·757	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·757	–	–	–	
		395	0·519	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·519	–	–	
		396	19·698	–	–	–	–	–	–	14·823	4·875	–	–	–	–	–	–	–	–	–	–	–	–	–	
		397	1·720	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·720	–	–	–	–	
		398	9·366	–	9·366	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
		399	1·446	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·446	–	–	–	–	
		400	0·580	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·580	–	–	
		401	17·153	–	17·153	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
			236·822	–	70·279	–	–	–	–	35·073	4·875	–	–	–	–	–	–	–	118·115	5·202	1·843	1·099	0·336	–	Lawhead.
	2	402	5·395	–	5·395	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
		403	7·380	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	7·380	–	–	–	–	–	
		404	3·543	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3·543	–	–	–	–	–	
		405	0·200	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·200	–	–	–	
		406	0·200	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·200	–	–	–	
		407	17·011	–	2·200	–	–	–	–	4·500	3·500	–	–	–	–	–	–	–	6·811	–	–	–	–	–	
			33·729	–	7·595	–	–	–	–	4·500	3·500	–	–	–	–	–	–	–	17·734	–	0·400	–	–	–	Marchwell.
	3	408	14·578	–	–	14·578	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
		409	21·337	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	21·337	–	–	–	–	–	
		410	59·246	–	–	–	–	–	–	22·000	–	–	–	–	–	–	–	–	37·246	–	–	–	–	–	
		411	18·589	–	18·589	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
		412	1·517	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·517	–	–	
		413	21·744	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	21·744	–	–	–	–	–	
		414	9·162	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	9·162	–	–	–	–	
		415	18·161	–	18·161	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
		416	1·761	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·761	–	–	
		417	1·608	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·608	–	–	–	
		418	0·275	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·275	–	–	–	
		419	2·016	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2·016	–	–	–	–	–	
		420	3·085	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3·085	–	–	–	–	
		421	26·570	4·200	22·370	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
		422	0·179	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·179	–	–	

		423	6·739	–	–	–	–	–	–	–	6·739	–	–	–	–	–	–	–	–	–	–	–	–	–	
		424	0·200	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·200	–	–	–	
		425	0·167	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·167	–	
		426	3·970	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3·970	–	–	–	–	–	
		427	0·163	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·163	–	–	–	–	–	
		428	16·828	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	16·828	–	–	–	–	–	
		429	1·120	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·120	–	–	
			229·015	4·200	59·120	14·578	–	–	–	22·000	6·739	–	–	–	–	–	–	–	103·304	12·247	2·083	4·577	16	–	Cuiken.
	4	430	5·792	–	5·792	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
		431	4·347	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	4·347	–	–	–	–	–	
			10·139	–	5·792	–	–	–	–	–	–	–	–	–	–	–	–	–	4·347	–	–	–	–	–	Cuiken (No. 4).
	5	432	13·733	–	13·733	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	Cuiken (No. 5).
	6	433	1·205	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·205	–	–	–	–	
		434	0·417	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·417	–	–	–	
		435	13·845	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	13·845	–	–	–	–	–	
		436	13·539	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	13·539	–	–	–	–	–	
		437	24·412	–	9·000	–	–	–	–	15·412	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
		438	21·490	–	–	11·200	–	–	–	–	–	–	–	–	–	–	–	–	10·290	–	–	–	–	–	
		439	19·729	–	19·729	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
		440	1·476	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·476	–	–	–	–	–	
		441	0·489	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·489	–	–	–	
		442	3·665	–	–	–	–	–	–	–	3·665	–	–	–	–	–	–	–	–	–	–	–	–	–	
		443	1·024	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·024	–	–	–	–	
		444	0·295	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·295	–	–	–	
		445	23·409	–	11·560	4·200	–	–	–	–	–	–	–	–	–	–	–	–	7·649	–	–	–	–	–	
			124·995	–	40·289	15·400	–	–	–	15·412	3·665	–	–	–	–	–	–	–	46·799	2·229	1·201	–	–	–	Greenlaw Mains.
	7	446	28·331	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	28·331	–	–	–	–	
		447	2·718	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2·718	–	–	–	–	
		448	5·701	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	5·701	–	–	–	–	
			36·750	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	36·750	–	–	–	–	Wood.
XII.	1	449	0·326	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·326	–	–	–	
		450	12·929	–	4·900	–	–	–	–	–	–	–	–	–	–	–	–	–	8·029	–	–	–	–	–	
		451	12·358	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	12·358	–	–	–	–	–	
		452	2·728	–	–	–	–	–	–	2·728	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
		453	6·892	–	6·892	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
		454	4·734	–	–	–	–	–	–	4·734	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
			39·967	–	11·792	–	–	–	–	7·462	–	–	–	–	–	–	–	–	20·387	–	0·326	–	–	–	Mauricewood Mains.
	2	455	0·519	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·519	–	–	–	Parish School.

(continued)

COUNTY of EDINBURGH, PARISH of GLENCROSS.—AGRICULTURAL STATISTICS for the Year 1855—*continued*.

Reference Number on Plans.			Area in Acres.	CORN, BEANS, AND PEAS.						GREEN CROPS.							Flax.	Meadow and Clover.	Rough Pasture and Mountain.	Woods and Plantation.	Houses and Gardens.	Roads.	Water.	Foreshore.	REMARKS.
Properties.	Tenements.	Inclosures.		Wheat.	Oats.	Barley.	Bere.	Rye.	Beans and Peas.	Turnips.	Potatoes.	Mangel Wurzel.	Carrots and Parsnips.	Cabbages.	Vetches.	Other Green Crops.									
XII (*contd*)	3	456	18·012	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	18·012	–	–	–	–	
		457	0·132	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·132	–	–	–	
		458	1·775	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·775	–	–	–	–	
		459	0·438	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·438	–	–	–	
		460	1·857	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·857	–	–	–	–	
		461	0·621	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·621	–	–	–	
		462	1·069	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·069	–	–	–	–	–	
		463	0·519	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·489	–	–	0·030	–	
			24·423	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·069	22·133	1·191	–	0·030	–	Mauricewood.
XIII.	1	464	2·779	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2·779	–	–	–	–	–	
		465	3·344	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3·344	–	–	–	–	–	
		466	2·565	–	2·565	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
		467	0·983	–	–	–	–	–	–	0·983	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
		468	0·067	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·067	–	–	–	
		469	3·074	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3·074	–	–	–	–	
		470	0·275	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·275	–	–	–	
		471	0·662	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·662	–	–	–	–	
		472	2·407	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2·407	–	–	–	–	–	
		473	1·252	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·252	–	–	–	–	–	
		474	1·313	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·313	–	–	–	–	–	
		475	1·883	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·883	–	–	–	–	–	
		476	2·097	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2·097	–	–	–	–	–	
		477	21·856	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	21·856	–	–	–	–	
			44·557	–	2·565	–	–	–	–	0·983	–	–	–	–	–	–	–	–	15·075	25·592	0·342	–	–	–	Bellwood.
	2	478	0·148	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·148	–	–	–	Bellwood House.
XIV.	1	479	2·423	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2·423	–	–	–	–	–	
		480	1·558	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·558	–	–	–	–	–	
		481	0·995	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·995	–	
		482	11·127	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	11·127	–	–	–	–	–	
		483	6·851	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	6·851	–	–	–	–	–	
		484	3·370	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3·370	–	–	–	–	–	
		485	10·216	–	–	4·500	–	–	–	–	–	–	–	–	–	–	–	–	5·716	–	–	–	–	–	
		486	1·130	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·130	–	–	–	
			37·670	–	–	4·500	–	–	–	–	–	–	–	–	–	–	–	–	31·045	–	1·130	–	0·995		Pathhead House.
	2	487	15·687	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	15·687	–	–	–	[illegible]law Prison.

XV.	- -	488	0·244	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·244	–	–	–	Sunnyside.
XVI.	- -	489	0·448	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·448	–	–	–	
		490	0·086	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·086	–	
		491	0·986	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·986	–	–	–	–	–	
		492	0·316	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·316	–	
		493	1·161	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·161	–	–	–	–	
		494	4·388	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3·388	–	1·000	–	–	–	
		495	0·697	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·697	–	–	–	–	–	
		496	1·853	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·733	–	0.120	–	–	–	
		497	0·931	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·931	–	
		498	0·702	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·702	–	
		499	0·709	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·709	–	
			12 277	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	6·804	1 161	1·568	–	2·744	–	Dalmore Mill.
XVII.	1	500	0 981	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·981	–	–	–	–	
		501	0·356	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·356	–	–	–	
		502	1·914	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·914	–	–	–	–	
		503	34 153	–	9·500	3·500	–	–	–	6·000	4·300	–	–	–	–	–	–	–	10·853	–	–	–	–	–	
		504	1·547	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1·547	–	–	–	–	–	
		505	0·757	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·757	–	–	–	–	
		506	3·522	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3·522	–	–	–	–	
		507	8·439	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	8·439	–	–	–	–	
		508	0·560	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·560	–	
			52·229	–	9·500	3·500	–	–	–	6·000	4·300	–	–	–	–	–	–	–	12·400	15·613	0·356	–	0·560	–	Beeslack.
	2	509	7·900	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	7·900	–	–	–	–	–	
		510	0·200	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·200	–	–	–	–	–	
			8·100	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	8·100	–	–	–	–	–	Eastfield.
XVIII.	- -	511	0·117	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0·117	–	–	–	Bush Loan.
Public Roads	-	512 to 531	74·048	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	74·048	–	–	Public Roads.

ORDNANCE PLAN

OF THE

PARISH OF GLENCROSS

in the COUNTY of

EDINBURGH

Shewing the several

Properties and Tenements

To illustrate the mode of collecting the Agricultural Statistics of the Country recommended by Lt Col: H. James R.E. Superintendent of the Ordnance Survey.

Scale of Map
Six Inches to One Mile.

Appendix B.

PAPER submitted to the Committee by Lord Berners, 22 June 1855.

NOTE of the Mode of Procedure as to Sales of Grain in the Haddington Corn Exchange, 22 June 1855.

Each person exposing grain for sale in the Exchange takes a sample bag, or boll of four bushels of the grain, to the weighing machine in the Exchange, where it is weighed by persons appointed by the magistrates for that purpose. The weight is marked with chalk on the sack. After depositing his sample bag in the proper place in the Exchange, the person in charge of the grain attends at the clerk's box in the Exchange, and gets a ticket applicable to the kind of grain he has for sale, on which is marked the number of the sample, to whom the grain belongs, the quantity for sale, and the weight of the sample of four bushels. This ticket the exposer deposits in his sack for the examination of buyers. Two tickets are annexed, showing the tickets issued to the first two persons exposing samples of wheat in the Exchange this day (22 June 1855):—

HADDINGTON WHEAT MARKET. No. 1, Mr. Hardie, Marklemains.			
QUANTITY.	WEIGHT of 4 Bushels.		
Quarters.	Stones.	Lbs.	*N. B.*—A penalty of at least 5 *s.* will be imposed if this Ticket is not returned, and a report made as soon as the sack is tied up.
8	18	11	

HADDINGTON WHEAT MARKET. No. 2, Mr. Hope, Fentonbarns.			
QUANTITY.	WEIGHT of 4 Bushels.		
Quarters.	Stones.	Lbs.	*N. B.*—A penalty of at least 5 *s.* will be imposed if this Ticket is not returned, and a report made as soon as the sack is tied up.
21	18	7	

At the same time that the clerk in the box issues these tickets, he enters, in the book containing the records of the sale of wheat, similar information to that contained in the tickets thus:—

WHEAT.

No.	NAME.	WEIGHT.	QUANTITY		PRICE, per Quarter.	PROCEEDS.
			Exposed.	Sold.		
		st. lb.			£. *s. d.*	£. *s. d.*
1	Hardie, Marklemains -	18 11	8	*8*	*3 17 6*	*31 – –*
2	Hope, Fentonbarns -	18 7	21	*21*	*3 14 –*	*77 14 –*

Immediately after the sale of the grain, the person in charge of it returns the ticket to the clerk, and intimates the quantity he has sold, and the price. These are entered, as above, *in italic figures.*

The same procedure is adopted with reference to barley, oats and beans, a separate book being kept for each kind of grain.

When the whole tickets are returned, the clerk finds the value of each quantity of grain sold, and inserts it in the proper column; finds the total quantity of each kind of grain *exposed* for sale, the total quantity *sold*, and the value or gross proceeds of each kind by summing up the different columns in the books, and, by dividing the proceeds by *the quantity sold*,

Appendix B.

sold, finds the average. From the information so obtained, a report is made up, and sent to the newspapers for publication. A copy of the report of this date (22 June 1855) is here annexed:—

" Haddington Corn Exchange, 22 June 1855.

" The supply of barley was larger, and of other kinds of grain smaller, than in last market. Sales were rather quick.

		s.	d.		st.	lbs.
Wheat, top 1 *s.* up, - -	and average 1	8	up.	Weight of top, per 4 bush.	18	12
Barley, top same as last market, and average	1	3	up.	Weight of top, per 4 bush.	16	12
Oats, top same as last market, and average	–	3	down.	Weight of top, per 4 bush.	13	5
Beans, top 2 *s.* down, - -	and average 1	7	up.	Weight of top, per 4 bush.	19	10

	Qrs.		Qrs.		Qrs.		Qrs.
Total Quantity in market, of Wheat -	311	Barley -	219	Oats -	165	Beans -	47
Total Quantity sold - of Wheat -	311	Barley -	196	Oats -	149	Beans -	35

" Prices, per Imperial Quarter:

	s.	d.		s.	d.		s.	d.		s.	d.
Wheat, 1st -	78	–	Barley, 1st -	38	–	Oats, 1st -	34	6	Beans, 1st -	49	–
„ 2d -	75	2	„ 2d -	36	6	„ 2d -	33	3	„ 2d -	48	3
„ 3d -	65	–	„ 3d -	30	–	„ 3d -	32	6	„ 3d -	47	–

" The 311 Quarters of Wheat sold thus:—

	£.	s.	d.		£.	s.	d.		£.	s.	d.
40 at - -	3	18	–	50 at - -	3	16	–	32 at - -	3	12	–
25 at - -	3	17	6	14 at - -	3	15	–	5 at - -	3	10	–
36 at - -	3	17	–	69 at - -	3	14	–	4 at - -	3	8	6
23 at - -	3	16	6	7 at - -	3	13	6	6 at - -	3	5	–

" Net Averages, per Imperial Quarter.

	£.	s.	d.		£.	s.	d.		£.	s.	d.		£.	s.	d.
Wheat -	3	15	$2\frac{0}{12}$	Barley -	1	16	$6\frac{7}{12}$	Oats -	1	13	$3\frac{2}{12}$	Beans -	2	8	$3\frac{1}{12}$"

Appendix C.

Copy of Communications from the Poor Law Commissioners relative to Agricultural Returns.

(No. 443, M. 1854.)

Poor Law Commission Office, Dublin,
27 October 1854.

Sir,

I am directed by the Commissioners for administering the Laws for Relief of the Poor in Ireland to acquaint you that they see no objection to the Circular Letter, which you propose to issue to the several Boards of Guardians in Ireland, a copy of which was sent by you to the Chief Commissioner, on the 25th instant, and is returned herewith, on the subject of the Agricultural Returns which, since the year 1847, have been collected under the direction of Her Majesty's Government; and I am to enclose for your information a draft copy of a circular on the subject, which has this day been placed in the hands of the printer, and which will be issued to the several Boards of Guardians as soon as the copies can be obtained.

By order of the Commissioners,

(signed) B. Banks,
for Secretary.

William Donnelly, Esq.,
Registrar-general, Henrietta-street.

(No. 442, M. 1854.)

Poor Law Commission Office, Dublin,
28 October 1854.

Gentlemen,

The Commissioners for administering the Laws for Relief of the Poor in Ireland desire to inform you that they understand that the Registrar-general is about to address the several Boards of Guardians in Ireland on the subject of the Agricultural Returns which, since the year 1847, have been collected under the direction of Her Majesty's Government, and to solicit the assistance of the various Boards of Guardians, especially with a view to ascertaining, as nearly as possible, the average rates of produce in different districts.

The Commissioners request that the Board of Guardians will be so good as to direct their clerk to afford every assistance in his power to the Registrar-general in procuring the information required.

By order of the Commissioners,

(signed) W. Stanley, Secretary.

To the Board of Guardians of the
Union.

Appendix C.

AGRICULTURAL STATISTICS, IRELAND.

(Copy Circular.)

5, Henrietta-street, Dublin,
24 June 1854.

Sir,

The Lord Lieutenant having been pleased to direct that the Returns of agricultural produce and live stock in Ireland should be collected this year, under my superintendence, as was done in 1853, may I take the liberty of requesting that you will be so good as to give to the constabulary, who act as the enumerators, the advantage of your influence and support when employed on this duty in your neighbourhood, in order that the Returns may be as accurate as possible, and collected without delay.

The importance of correct information on these subjects is now universally acknowledged, and admitted to be of great value, not only to the merchant, manufacturer and consumer, but also to the producer; you will therefore be advancing a great public good by assisting to remove any prejudice opposed to these inquiries, which may, from a want of acquaintance with the object, exist in the minds of the farming classes in your district.

I beg to annex specimens of the Forms on which the information is to be collected by the constabulary, and to state *that the Inquiries referred to will commence during the first week of July.*

I have, &c.
(signed) William Donnelly,
Registrar-general.

To

Copies of this Circular were forwarded to the under-mentioned parties in Ireland:

The Nobility.

The Magistracy.

The Clergy of all denominations.

The Assistant Barristers of the several counties.

The Heads of the several Government and Banking Departments; and Individuals who, from their position, would be likely to aid in the object in view.

Specimen Forms.

Form A.

County of — Parish of
Barony of — Union of
Constabulary District— — Electoral Division of

Tillage Return for 1854.

Townland,_____

Area of ditto in Statute Acres,_____(per Ordnance Survey.)

Names of Landholders.	Area of each Farm in Statute Acres.	Area of Ground under Crops, in Acres and Parts of Acres.																				Grass.	Woods or Plantations.	Fallow and unemployed Arable Land.	Bog or Waste.	Total Uncultivated.	Names of Persons from whom this Information was received.
		Wheat.	Oats.	Barley.	Bere.	Rye.	Beans.	Peas.	Potatoes.	Turnips.	Mangold Wurtzel.	Beet Root.	Carrots.	Parsnips.	Cabbage.	Vetches.	Other Green Crops.	Flax.	Rape.	Meadow and Clover.	Total Cultivated.						
Total of Townland																											

I certify, that I visited the Townland of , on the day of , for the purpose of obtaining the above information, and that this Return is correct, to the best of my knowledge and belief.

Dated at , this day of 1854.

[Signature and Rank of Enumerator.]

Form B.

County of — Parish of
Barony of — Electoral Division of

Return of Live Stock, 1854.

Townland,_____

Area of ditto in Statute Acres, _____

Names of Landholders.	Area of each Farm in Statute Acres.	Number of Horses, with the Purposes for which they are kept.					Number of Mules and Asses.		Number of Cattle.					Number of Sheep.		Number of Pigs.		Number of Goats.	Number of Poultry.	Names and Address of Persons from whom Enumerator received Information. If inserted on his own knowledge or Observation, to be so stated.	Name of the Owner in Fee, or the Head Landlord.
		Two Years old and upwards.									Other Cattle.										
		Agricultural.	Traffic and Manufactures.	Amusement.	One Year old and under Two.	Under One Year.	Mules.	Asses.	Milch Cows.	Draft Bullocks.	Two Years old and upwards.	One Year old and under Two.	Under One Year.	One Year old and upwards.	Under One Year.	One Year old and upwards.	Under One Year.				
Total of Townland																					

I certify, that I visited the Townland of on the day of 1854, for the purpose of obtaining the above information, and that this Return is correct, to the best of my knowledge and belief.

Dated at , this day of 1854.

[Signature and Rank of Enumerator.]

Appendix C.

AGRICULTURAL STATISTICS (IRELAND), 1855.

GENERAL INSTRUCTIONS.

5, Henrietta-street, Dublin, 20 June 1855.

I. Enumeration Districts.

1. The returns of townlands used for the census of 31st March 1851, which are still in the hands of the police, will assist superintendents to divide their constabulary districts into convenient sub-districts for carrying out the objects of the present agricultural inquiry, and in doing so they are also recommended to avail themselves of the Ordnance maps, in order that the sub-districts may be of the most convenient size.

2. Blank forms of Returns (E.) will be supplied, in which superintendents will enter the names of the townlands allotted to each enumerator. These returns are to be prepared *in duplicate*, one copy to be sent to this office, the other to be given to the enumerator.

II. Tillage Returns.

1. For the greater convenience of compiling the information, it is proposed to collect the extent of tillage in each townland on one set of returns, and the number of live stock on another. Form A. is prepared for the former, and Form B. for the latter.

2. Form A. will contain the names of all persons occupying land within each townland, also the size of their farms, the quantity of land under each description of crop, and the quantity uncultivated,—each to be given in Statute (or *English*) Acres. When bog or waste land is held with the farm, it should be stated in the details, and also in the total of the farm; but where tracts of land of any description are not occupied by a tenant farmer, or cultivated by the proprietor, their extent ought to be ascertained as nearly as possible, and added at foot of the return, in *the proper* columns, *in the name of the proprietor*. The total of all these quantities should be equal to the area of the townland, according to the Ordnance Survey.

3. In the case of a farmer holding land in two or more townlands, the name of the *townland in which he resides should be stated*, and also whether all the lands held by him are to be considered as one, or as separate farms. If, however, *the farms adjoin each other*, though in different townlands, they may be considered as forming only one farm; *but if detached*, each separate lot is to be considered as a distinct holding.

4. Tables for converting Irish into statute (or English) acres, and statute (or English) into Irish acres, accompany these instructions.

5. *A precise* degree of accuracy in all those quantities is not expected, but there are few cases in which a very near approach to the truth may not be attained, and the area of the whole townland being stated at the head of Form A., a check upon the quantities given by the landholders, and a means of testing and correcting the general accuracy of the answers, is thus afforded. Upon adding up the areas of the several farms within each townland, if the total be found to differ more than five acres in 100 from the area of the whole townland, *further inquiry* should be made to ascertain the cause of the difference, and the previous statements corrected accordingly.

III. Returns of Live Stock.

1. Form B.—The first and second columns of this return will contain, like the first and second columns of Form A., the names of the landholders, and the extent of each holding. The other columns should show the number of each description of live stock on every farm, as expressed in the headings of the printed forms.

2. Grazing stock, or stock feeding on land not in the possession of the owner of the stock, *is to be considered as the stock of that land for the time being*, and should be returned as in the possession of the holder of the farm.

3. In the case of persons who have stock in their possession, *and are not landholders*, their names and the quantity of stock in the possession of each are to be entered on the same return with the landholders of the townland, merely drawing a line across the "*Area*" column.

4. In regard to towns, the stockholders and stock of each street may be made up on one form, as if it were a townland.

5. Where farms extend into more than one townland, the quantity of stock on the portion of the farm within each townland, at the time of the inquiry, should be entered *separately* in the returns, *taking care that none are twice enumerated.*

6. In the B. form are two columns for the purpose of distinguishing horses kept for amusement or recreation, and for general traffic and manufactures, from those used for agricultural purposes; and two also for cattle, in order to separate milch cows and bullocks used for labour from other animals of this class. In many cases, it will be found that the same horses are kept for amusement as well as for labour; and in every instance where any portion of the labour of the animal is given to productive employment, the horse is to be set down

down in either of the columns, "Agriculture," or "Traffic and Manufactures," as the case may be.

IV. Returns of Produce.

The extent of land cultivated is only one part of the information necessary to form a basis for calculating the quantity of food produced in Ireland, *the yield* being equally important, but much more difficult to arrive at. Form C., which will be forwarded in due time, with detailed instructions, has been framed for the purpose of ascertaining the average rate of produce per acre, and made as simple as the subject admits.

V. Returns as to Prevalence of Weeds.

Form K. has been prepared in order to ascertain the degree of care observed by farmers in keeping their lands free from weeds; and if any, and what, precautions are taken by road contractors or others to *prevent the weeds on the sides* of the public roads, railways and canals from shedding their seed, thus becoming, as is too frequently seen, a nuisance, and doing great injury to adjoining farms. One of these forms is to be filled up by each enumerator for the townlands allotted to him, and he is requested to state the result of his own observations on this subject.

VI. Abstracts of the A. and B. Returns of Enumeration Districts.

As soon as each enumerator has completed the A. and B. returns of the townlands allotted to him, he will fill up with great care the abstracts marked F^1. and F^2., which are designed to show at one view the results of the inquiries he has made; and these abstracts are to be placed in front of the files of the returns to which they belong.

VII. Scutching Mills.

In consequence of the increasing importance of flax cultivation, Form D. has been prepared for the purpose of ascertaining the number and description of mills employed in Ireland for dressing flax by machinery. One of these forms is to be filled up for *each constabulary sub-district* in Ireland; and in those sub-districts where no mill of the kind exists, a statement to that effect, signed by the constable, is to be written on one of these forms, and forwarded with the other returns.

VIII. Printed Forms.

In deciding upon the supply of A. and B. Forms to be issued to each constabulary district, a criterion is afforded by the number of tillage and live stock returns received from each district last year.

IX. Forwarding Returns.

1. When the returns for any district have been completed, they are to be carefully made up and forwarded by post to this office. The proper address is given on the printed labels, one of which should be pasted on each parcel.
2. An invoice of the contents of each parcel should be posted at the same time, *but in a separate envelope.*
3. Letters or papers forwarded to this office are *not to be prepaid.*

X. Finance.

1. Each sub-inspector or head constable who shall discharge the duties of a superintendent on the agricultural inquiry, will be allowed to claim the sum of 2*s.* 6*d.*, to cover his expenses for stationery, in addition to his claim for any charges for postage or carriage of parcels unavoidably incurred, the particulars of which should be clearly stated in a Form of Account, No. 3. And each member of the constabulary force employed as an enumerator will be allowed the sum of 2*s.* to cover the cost of stationery and other incidental expenses arising out of this duty, exclusive of car-hire, boat-hire, and an allowance of 1*s.* per night when necessarily absent for the night from his barrack. The claims for allowances for stationery, &c., are to be made on Form of Voucher, No. 1, and for nightly allowance on Form of Voucher, No. 4.

2. In conformity with the circular of the Inspector-general of the 1st September 1853, and the Chief Secretary's Minute of the 3d October following, members of the constabulary, employed on the agricultural inquiry, who may devote more than 10 hours in any one day to this duty, will be entitled to an allowance of 6*d.* for every day whilst so employed, to be charged to this service, the claims for which are to be made out on form of voucher No. 5. As the duties of the agricultural inquiry extend over several days, it is conceived that the time employed should not exceed eight or nine hours a day, except in a case of emergency, of which, it is hoped, that each superintendent will fully satisfy himself, before he admits the claim. In cases in which the townlands to be visited are remote from the station, and where it may be judicious to make this allowance for several consecutive days, *instead of the nightly allowance for absence from quarters,* a report of the facts should be made by the Superintendent to the Registrar-general, and his approval obtained *previous* to incurring the expense.

Appendix C.

3. Applications for leave to employ interpreters should state the number of days for which the services of each will be required. Their rate of pay is not to exceed 1 *s.* per diem, and it should be claimed on Form of Voucher, No. 2.

4. Boat-hire, car-hire, or any other extraordinary charges, should be claimed on Form of Account, No. 3, in which every detail necessary to a perfect understanding of the nature of the demand and the value of the service is to be fully stated. *The written authority of the Registrar-general must be previously obtained for incurring the expenses* referred to on Forms of Vouchers 2, 3, 4 and 5, except in a case of emergency; the authority is to be attached to the voucher when forwarded to this office.

5. No payment is to be made to any person on behalf of another without the permission of the Registrar-general.

6. All accounts are to be furnished not later than 10 days after the enumeration has been completed, in order to their prompt discharge.

XI. General Observations.

1. It is most important that these inquiries should be entered upon in each district, *as nearly as possible at the same time.* The Registrar-general, therefore, recommends *Monday, the 16th of July*, as the day on which the enumeration may be advantageously commenced, and that it be prosecuted as diligently as circumstances will permit until completed, *as the Government is desirous of being informed of the results at an early period*, and in order that the errors arising from the transfer of stock from one proprietor to another during the period of the inquiries may be as few as possible, expedition is most desirable. A return according to Form G. should be forwarded to this office without delay, to show when the inquiries in each enumeration district will probably be concluded.

2. *A few individuals from different localities, and amongst them some persons of much intelligence, whose opinions are deserving of attention, have occasionally impugned the accuracy of the annual returns of agricultural produce, made by the constabulary, more particularly in reference to green crops. It is therefore strongly urged upon the members of the force who may now be appointed enumerators for the performance of this important duty, that every possible care should be taken in making the inquiries and in noting accurately, not only the information they receive, but also, in the proper columns, the names of the persons from whom they receive it, so that no difficulty may arise, in establishing the fact that the constabulary discharged the duty confided to them in their usual creditable and trustworthy manner—should investigations hereafter take place into the published results of their inquiries and returns.*

Recent experience has shown that the enumerators have, in some cases, had much difficulty in arriving at even an approximation to the extent of " woods or plantations;" their attention is now, therefore, more particularly directed to this subject, as being one which requires increased care.

Errors have sometimes arisen in preparing fair copies of the Returns A. and B by inserting the facts previously collected, *in wrong columns*,—this a little watchfulness will guard against in future.

3. In carrying the foregoing instructions into effect, the enumerators will take care to observe the utmost civility; the information sought is to be asked for with gentleness, and by no means enforced with harsh language or threats. It is to be borne in mind, that almost all persons view inquiries of this character with jealousy in proportion to their want of knowledge of the results sought to be obtained; it is, however, considered that the publications which have resulted from similar previous inquiries have already done much to remove prejudices from the minds of all classes, so that it is confidently expected the returns of this year will be collected with facility, and that the required information will on public grounds be faithfully given to the enumerators by occupiers of land, and also by proprietors of stock.

(signed) William Donnelly, Registrar-general.

I approve of the foregoing instructions being addressed to the Constabulary, who will use their best exertions to obtain early and accurate information for the Government on the subjects referred to by the Registrar-general.

(signed) D. McGregor, Inspector-general.

Approved,

(signed) Thos. A. Larcom.

Pattern Returns.

Form A., No. 1.

County—Wicklow.
Barony—Rathdown.
Constabulary District—Bray.

Parish—Goldenball.
Poor Law Union—Rathdown.
Electoral Division—Glencullen.

Return of Tillage, 1855.

Townland—Ballymoran.
Nearest Post Town—Goldenball.
Area of Townland in Statute Acres - - - - 684.

Names of all Landholders in this Townland.	Area of each Holding in Statute Acres.	Extent of Land under Crops in Statute Acres and Parts of Statute Acres.																				Grass.	Woods or Plantations.	Fallow and uncropped Arable Land.	Bog or Waste.	Total, Grass, Woods, &c.	Names of Persons from whom the Information was received.
		Wheat.	Oats.	Barley.	Bere.	Rye.	Beans.	Peas.	Potatoes.	Turnips.	Mangel Wurzel.	Beet Root.	Carrots.	Parsnips.	Cabbage.	Vetches.	Other Green Crops.	Flax.	Rape.	Meadow and Clover.	Total Extent under Crops.						
James Moran - -	105	5	10	8	7	3½	3	2	9	4½	3¾	–	4	3	–	–	–	5	–	6	73¾	20	–	5	6¼	31½	Mrs. Moran.
Henry May - -	216	15	33	30	10	11	5	5	30	12	12	–	5	–	–	–	–	4	–	20	192	20	–	1	3	24	H. May.
Wm. Robinson -	20	–	5	–	–	–	1	½	2	2	–	–	–	¼	¼	–	–	¼	–	6	18	1¼	–	–	¼	2	W. Robinson.
John Mooney - -	66	5	8	3	3	1	5	–	5	7	7	–	–	2	¼	–	–	1½	–	8	56¼	8	–	–	1¾	9¾	Mooney's Son.
John Thompson -	127	7	9	5	5	6	7	1	10	3	6	–	2	3	5	–	–	6	–	12	87	30	2	2	6	40	J. Thomson.
James Byrne - -	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	James Byrne.
Waste, unallotted -	150	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	150	150	Observation.
Total - - -	684	34	65	46	25	21½	21	8½	56	28½	28¾	–	11	8½	6¼	–	–	17	–	52	427	79½	2	8	167½	257	

I certify that I visited the Townland of Ballymoran, on the 16th day of July 1855, for the purpose of obtaining the above information, and that this Return is correct, to the best of my knowledge and belief.

Dated at Enniskerry, this 20th day of July 1855.

[Signature and Rank of Enumerator.] Joseph Scully, Constable.

Form B., No. 1.

County—Wicklow.
Barony Rathdown.
Constabulary District—Bray.

Parish—Goldenball.
Poor Law Union—Rathdown.
Electoral Division—Glencullen.

Return of Live Stock, 1855.

Townland—Ballymoran.
Nearest Post Town—Goldenball.
Area of Townland in Statute Acres - - - - 684.

Names of Landowners and Stockowners.	Area of each Holding in Statute Acres.	HORSES, with the Purposes for which they are kept.						Mules and Asses.		CATTLE.					SHEEP.				PIGS.			Number of Goats.	Number of Poultry.	Name and Address of Person from whom Enumerator received Information. If inserted on his own Knowledge or Observation, to be so stated.	Name of the Owner in Fee, or Head Landlord.
		Two Years old and upwards.			One Year old and under Two.	Under One Year.	Total Number of Horses.	Number of Mules.	Number of Asses.	Milch Cows.	Bullocks used for Labour.	Two Years old and upwards.	One Year old and under Two.	Under One Year.	Total Number of Cattle.	One Year old and upwards.		Under One Year.	Total Number of Sheep.	One Year old and upwards.	Under One Year.	Total Number of Pigs.				
		Agricultural.	Traffic and Manufactures.	Amusement or Recreation.												Ewes.	Tups and Wethers.									
James Moran - -	105	1	–	1		2	5	–	1	–	1	4	1	2	8	8	4	5	17	6	6	12	2	36	Owner - -	John Smith.
Henry May - -	216	3	–	–	2	2	7	1	–	2	1	10	2	5	20	8	7	3	18	2	7	9	–	30	ditto - -	- ditto.
William Robinson -	20	1	–	–	–	–	1	–	1	–	–	3	–	–	3	–	–	–	–	1	3	4	1	10	Observation -	- ditto.
John Mooney - -	66	1	1	–	1	–	3	–	–	1	–	3	1	3	8	8	4	7	19	2	6	8	–	25	Owner - -	- ditto.
John Thompson -	127	1	1	3	1	3	9	1	–	1	–	4	2	4	11	25	15	11	51	7	10	17	2	60	John Reilly, Goldenball, Bailiff to the Estate -	ditto.
James Byrne - -	–	–	–	–		–	–	–	1	–	–	1	–	1	2	–	–	–	–	–	1	1	1	6		ditto.
Waste, unallotted -	150	–	–	–	–	–	–	–	–	–	–		–	–	–	–	–	–	–	–	–	–	–	–	Observation -	- ditto.
Total - - -	684	7	2	4	5	7	25	2	3	4	2	25	6	15	52	49	30	26	105	18	33	51	6	167		

I certify that I visited the Townland of Ballymoran, on the 16th day of July 1855, for the purpose of obtaining the above information, and that this Return is correct, to the best of my knowledge and belief

Dated at Enniskerry, this 20th day of July 1855.

[Signature and Rank of Enumerator.] Joseph Scully, Constable.

Appendix D.

Appendix D.

PAPERS delivered in by Mr. Samuel Sandars, 25th June 1855.

SUGGESTIONS for Agricultural Statistic Returns for *England* and *Wales*, made on the 21st day of October in each year, to be sent to the Collector within 14 days.

1. To appoint an intelligent Agriculturist as Inspector for each county, holding not less than 50 acres in his own occupation, with a salary of 60*l.* to 100*l.* a year, varying with the extent of the returns.

2. In Hertfordshire there are 135 parishes, and according to Sparkman's Statistic Analysis the farmers are 1,900, and the collation of that number of returns by the inspector would not occupy more than 10 or 12 days, and the whole of the returns might be submitted to the Board of Trade in the month of November, and as there would be only 52 counties (some of the largest of which it might be desirable to divide) the whole of the actual returns from the county inspectors might amount to 60 or 65, and the Board of Trade would be enabled to arrive at the combined amount of the returns within a few hours' labour on receiving them from the inspectors.

3. The mode of obtaining the returns should be through the medium of the collector of assessed taxes, who is a fixed officer, and in the habit of sending schedules to each occupier; any portion of such returns may be returned to the collector, sealed, and addressed to the county inspector; this would avoid any unpleasantness on the part of the farmer to an objectionable surveillance of his business by his neighbours, and there would be then little inducement to make unfair returns.

4. To confine the returns to farmers and occupiers of land not holding less than five acres of arable land or 10 of pasture.

5. The collector of the returns to be paid 1*s.* for each schedule, to be paid him by the overseers of the poor of the parish on the certificate of the inspector.

6. All parties refusing or neglecting to make such returns shall be summoned for penalties on the instructions of the inspector to that effect, and all fines paid to the overseers of the parish.

7. The inspector, for the more certainty of obtaining the returns by a given day, shall despatch an agent into each hundred of the county to collect them from the returning officers.

8. Each collector of the returns shall send to the inspector a list of the names of the occupiers liable to make returns, with the number of acres in their occupation, and the required number of schedules shall then be forwarded to the collector, and the inspector, entering them in his books, would then have the lists in readiness to fill them up on the receipt of the returns, and be enabled to ascertain who were defaulters.

9. The object of making the returns so late as in October is to have a clear and correct estimate of the results of the different crops after their maturity; for all crops, particularly wheat, is liable to great injury in quality and quantity from bad harvest weather and the effects of mildew and blight when it is near maturity, for which no allowance could be made by any returns made in July or August, and the yield of the different crops would be to some extent ascertained by the quantities thrashed out previous to the 21st of October to be sent to market and for seed.

10. The expense of obtaining the whole of the returns to the Government, if the collectors are paid by the parish authorities (which in many instances would not exceed a few shillings, and in the largest parishes 3*l.* to 4*l.*) would be some 10,000*l.* to 12,000*l.*

RETURN

Appendix D.

RETURN of the Number of ACRES OF LAND in my occupation in this Parish, and their respective modes of Cultivation, from the 21st of October 1854 to 21st of October 1855.

TOTAL OCCUPATION, 300 ACRES.

CORN CROPS.	*Acres.*	PASTURE, MEADOW, AND WOODS.	*Acres.*
Wheat, winter sown	40	Clover and Artificial Grasses	20
Wheat, spring sown	20	Meadow and Pasture	60
Rye	—	Hops	—
Barley	30	Woad	—
Oats	30	Other Crops	10
Beans and Peas	10		90
Other Grain	—		
Fallows	20	Woods	20
	150		
ROOT OR OTHER CROPS:			
Turnips	20	TOTAL OCCUPATION:	
Potatoes	5	Corn Crops and Fallow	150
Carrots, Beet Root	5	Root Crops	40
Tares and Vetches	10	Pasture, Meadow, &c.	90
Flax	—	Woods	20
	40	Acres	300

RETURN of the Quantity of OLD WHEAT (if any) in Granary or in Stack, 1st September, the present year, about - - - - - - - - - Qrs. 30

REPORT of the Supposed yield and Weight per Bushel of the present Year's Crops of Wheat and Barley.

WHEAT:	BARLEY:
Full Crop.	Full Crop.
Average.	Average.
Short.	Short Crop.
Weight (about) 63 lbs. per bushel.	Weight (about) 52 lbs. per bushel.

GENERAL REPORT of the following Crops.

Hay and Clover, are they an Average Crop? Full Crop? Short?

Potatoes: Average Crop? Full Crop? Short?

Turnips: Average Crop? Full Crop? Short?

RETURN of the Number of HORNED CATTLE, HORSES, SHEEP, and SWINE in my possession at the Date of this Return, and the Number bred on my Farm within the 12 months.

STOCK ON HAND.		BRED ON THE FARM DURING THE YEAR.	
Horned Cattle	30	—	Number of Fleeces of Wool clipt the present Year: 150
Horses	14	—	
Sheep	200	—	
Swine	20	—	

I certify that the above Return is correct, to the best of my knowledge and belief.

Hemel Hempstead, County of Hertford. (signed) JOHN SMITH.

The Return must be filled up (and may be sealed, if desired, addressed to the County Inspector, with the name of the Occupier on the outside of the Schedule), within 14 days after the 21st of October—that is, on or before the 8th of November next—under a penalty of 40 *s.*

(signed) WILLIAM SEERS,
Collector of Returns for the Parish of Hemel Hempstead.

15 October 1855.

An important element of the Returns would be the quantity of old wheat in the farmers' hands on the 1st September in each year.

In 1853, Messrs. Sturge, of Birmingham, estimated the quantity as 5,000,000 quarters, or 38 per cent. of the annual growth of 13,000,000 quarters, whilst the writers' estimate was 2,000,000 quarters, or 14 per cent., and on the 1st September 1854 as only 500,000 quarters, or some 12 to 14 days' consumption.

Appendix D.

Proposed Union Assessment, and Free Trade in Labour.

The Poor-laws of this country are the foundation of our social and fiscal edifice, from their giving the right of subsistence to the working classes unable to find employment; and likewise virtually obliging the employer of labour to pay such a rate of wages as will cover all the incidences of taxation on the common necessaries of life consumed by the labourer, which enables them to pass such taxes to their employers.

The wages of the agricultural labourer, as the producers of food, are the basis of all other wages;—thus, assuming their weekly wages, irrespective of taxation, were 6 *s.* a week, and taxation adds 3 *s.* to the cost of their subsistence, it then requires 9 *s.* a week to enable the labourer and his family to exist, and keep clear of the workhouse.

We assume that 9 *s.* a week is about the general average in most agricultural districts, when the price of wheat is 50 *s.* a quarter; but when it rises considerably above that figure, wages are raised 1 *s.*, 2 *s.*, or 3 *s.* a week, and are again reduced to 9 *s.* when it falls to 50 *s.*; and in 1849 to 1853, the average price of wheat being 40 *s.*, wages were reduced in many counties to 8 *s.* a week.

The practical working of the present Poor-laws in the agricultural districts is this:—two or more guardians are appointed for each parish, who attend the Union Board with the object of keeping down the rates in their respective parishes as low as possible, and providing work for the unemployed; and in those parishes where labourers are not greatly in excess of the demand, should any labourer and his family, from want or sickness, or other cause, have been admitted into the workhouse (where the cost of their weekly subsistence is from 2 *s.* 6 *d.* to 3 *s.* a head), the guardians of each parish usually find them work either on the roads or amongst the farmers themselves.

Let us now look at the possible result of a union rate in this and many other agricultural districts.

The area of the Hemel Hempstead Union is 25,500 acres, and the total assessment 46,000 *l.*

Hemel Hempstead parish contains 7,300 acres, with a market town, a couple of paper mills, and 1½ miles of railway, which are assessed at 24,000 *l.*

Bovingdon - - -	4,000 acres,	assessed at	£. 4,200
King's Langley - -	3,400 „	„	3,600
Flamstead - - -	5,600 „	„	8,700
Gaddesden - - -	4,030 „	„	4,500
Flauden - - - -	970 „	„	1,000
Acres - - -	18,000		£. 22,000

Thus Hempstead is assessed to a greater extent than the other five parishes.

We now take the parish of Bovingdon as an example of union rating, which is assessed at 4,200 *l.* Under the existing law the parishioners of that parish are virtually compelled to employ all their labourers, giving them a rate of wages sufficient for their own maintenance and that of their families, or they must support them in the workhouse.

But, with a free trade in labour and corn, each farmer, as a general result, will feel himself at liberty to obtain his labour at the lowest possible rate of wages, without any regard to those having large families to maintain, or whether they are parishioners or strangers; and in many populous parishes where labour is abundant young unmarried men or strangers may be induced to take 1 *s.* a day, in which case men having large families will be obliged to submit to a similar rate of wages, and if they cannot exist upon them, they will be forced into the workhouse, where their maintenance will fall upon the union generally.

Thus, supposing an occupier of 200 acres in Bovingdon, on an average of the year, employs 10 labourers, a saving of 3 *s.* a week on each labourer will amount to 75 *l.* a year, and the lessened wages of 200 labourers cultivating 4,000 acres would be 1,500 *l.* a year.

But assuming 20 of their labourers are forced into the workhouse from their inability to exist on wages at 6 *s.* a week, and each family of five persons costing 39 *l.* 10 *s.* a year, it gives 790 *l.*, towards which Bovingdon will have to contribute 1-11th part, or 71 *l.* and the rest of the union 719 *l.*, of which Hempstead will pay some 412 *l.*

But there are other important elements of the question of a free trade in labour. May not the distress arising from any material decline in the rate of wages amongst the agricultural classes from unlimited competition lead to agrarian disturbances, to an inferior diet, and an inability to consume exciseable articles? Supposing there are 2,000,000 of labourers, and their wages lowered 3 *s.* a week, it would be 15,000,000 *l.* sterling,—a reduction that might ultimately tend to a collapse in our fiscal system.

We have always assumed that the combined effects of the Poor-laws and the Corn-laws that have kept the rate of wages in this country some 50 per cent. in excess of the natural cost of the subsistence of the working classes irrespective of direct or indirect taxation, has been one of the main sources of our public revenue, and that our 5,000,000 of labourers have been the humble instruments of annually engendering some 30,000,000 *l.* of taxation, which, with adequate wages, they have been enabled to pass to their employers, and their employers to the consumers, and ultimately we have further shown all such enhanced cost of wages, and consequently on the price of the commodities produced, must ultimately fall on the rich or non-producers, the constructors of houses, railways, ships, and other fixed properties, and the foreign consumer of our goods.

Observations on the Collection of the Corn Averages.

For a century previous to 1821, such returns were collected from the principal seaports of our 12 maritime counties, for the purpose of regulating the duties on foreign corn imported into this country under the different Corn-laws then in existence.

The collector of the returns was appointed by the magistrates of the borough or town making the return, having fixed salaries, which were paid by the Government.

In 1821, the averages were ordered to be collected from 120 large market-towns in England and Wales, and every merchant, miller, baker, or maltster, or purchaser of corn, were ordered to make weekly returns to the inspector, who was instructed to have a box in some public convenient situation wherein the returns might be deposited, and likewise to post up in some conspicuous place the gross weekly returns, with the average price of each description of grain sold the previous seven days in the town making such returns.

The averages were then forwarded to the Comptroller of Corn Returns, in London, and the gross amount was added together, the average of the whole struck, and formed one of the six weeks which then regulated the duties on the admission of foreign corn for home consumption.

This mode of collecting and giving publicity to the returns worked tolerably well; but at the same time it was not altogether without its drawbacks, as when the sliding scale of duties came into operation there were several instances of the averages being tampered with in London and some of the outports by false returns, with the view of lowering the rate of duties by fictitious sales of large quantities of wheat, beans, and oats, from one party to another; thus swelling the quantity returned, raising the prices, and lowering the duties to a great extent; and different prosecutions for such illegal practices were threatened by the Government, but not carried into effect.

In 1842, from a false economy, with the view of avoiding the expense of the paid collector, it was ordered that the old inspectors should still perform their duties, but when they died, or resigned, the exciseman of the town or district should collect the returns without any increase of his salary for so collecting them. The natural result has been, that in many instances great laxity has prevailed in looking after the returns, as the exciseman, who is a removable officer, has little or no knowledge of the different parties purchasing corn in his immediate district, and in many instances not one-fourth of the actual sales have been returned to the London inspector.

The abolition of the Corn-laws in 1849 has certainly lessened the importance of such weekly averages of corn in a fiscal point of view, but with the commutation of tithes they still remain a question of great importance.

We have long suggested the collection of agricultural statistics through the medium of the collectors of assessed taxes in each parish, and we further suggest, that the same official in every town making returns shall likewise collect the Corn Averages, being paid at the rate of 1 *d.* for each sale of corn; and assuming the weekly sales in any given market were 50, it would be a yearly salary of 10 *l.* 6 *s.* 8 *d.*, and in those towns where the sales are to a much larger extent, as in the shipping ports of the east coast, &c. &c., a lower rate of payment might be adopted.

We have lived long enough to know that unpaid servants will generally be somewhat lax in their duties, but the collector of the Corn Averages, having a weekly income from his collection, and from his general knowledge of the purchasers of corn in his immediate locality, we might then probably obtain something approximating to a fair return of all descriptions of corn sold in the different markets of the country.

Various crude suggestions have been brought forward, amongst others, that of including the tailings of wheat and barley in the returns; but these quantities are only a small fractional part of the whole product, and if sent to market as worth selling, they would be included in the general returns.

From our practical experience, we are further of opinion that any attempt to obtain effective returns through the medium of the farmers would prove abortive; and the suggestion of their being compelled to make monthly returns of all corn sold and delivered from their premises, is one of the most absurd and arbitrary measures ever submitted to the public.

We therefore are decidedly of opinion, that the returns should continue to be made by the merchants, millers, maltsters, and dealers in corn, of all purchases made direct from the farmer, and that the penalties for imperfect or non-returns should be strictly enforced.

Further, it might be desirable that the London returns should be omitted, as the Essex and Kentish runs sold by the factors have the expenses of freight, commission, &c., embodied in their selling price, which is some 3 *s.* or 4 *s.* the quarter in excess of what the farmer actually receives. (We recollect waiting upon the Chancellor of the Exchequer in 1814, and succeeded in having the Irish wheats sold in this country, which at that time were of very low quality, struck out of the general averages).

Should the duties on foreign corn at any future time again come under revision, the omission of the London averages would put an end to the trickery of concocted returns, of which London was the focus; as in one instance a large parcel of fine beans in granary was resold to different parties 9 or 10 times in as many days, in order to run up the averages and lower the duties.

Sam. Sandars.

Appendix E.

APPENDIX E.

MEMORANDUM on AGRICULTURAL STATISTICS by Lieutenant-Colonel JAMES, R. E., F. R. S., &c., Superintendent of the Ordnance Survey.

IN collecting the Statistics of Agriculture, the more immediate object aimed at is to ascertain the actual quantity and value of the crops annually produced in the country, and the actual quantity produced in the different districts of it; but in a more extended view of the subject, we should seek to combine the information obtained as to the actual produce, with information as to the causes upon which the fertility of the different districts depends, and thus to indicate the means by which, in future years, the amount of produce may be increased.

For the purpose of ascertaining the actual amount of the produce of the crops, I have submitted to the Government that, by the aid of the plans of the Ordnance Survey, we have the means of ascertaining the exact number of acres under the different kinds of crops in every township and parish; and then, with a knowledge of the average produce per acre, and of the value of a given weight or measure of the produce, we have the means of giving the total quantity produced, and the money value of the crops of the whole kingdom.

See Table of Produce.

The method I have recommended consists simply in having a reference number placed in each field on the plan, and in placing the reference numbers, with the acreage of the different fields, in the first and second columns of a Table of Produce.

The persons appointed to collect the statistics would then merely have to put a single letter in each field on the plan, to indicate the nature of the crop in it, as W. for wheat, O. for oats, &c., and afterwards make up his Table of Acreage.*

Stock.

The same persons would of course collect the amount of stock on each farm, for which proper forms would be prepared.

In the Table of Produce which I have drawn up, I have appropriated columns for the uncultivated land, woods, water, &c., as I conceive that every acre in the country should be accounted for; and as this can be readily done, it ought not to be neglected.

Examples: Parish of Glencross. Parish of Aberlady.

Properties and tenements distinguished.

In submitting the plan I have described to the Government, I accompanied it with the plans of the parish of Glencross, in the county of Edinburgh, and of the parish of Aberlady, in the county of Haddington, and I have marked on these the exact boundary of each separate property and of each separate farm or holding; and by putting the reference numbers to the fields after this was done, I have been able to give the produce of each farm and of each property, and the total number of acres in each. The size of the farms in the different districts is important in weighing the causes of the different amounts of produce in them.

Registration of property. Valuation of property. Boundaries of property should be shown on the Ordnance Maps. Act of Parliament required.

The Ordnance Survey will in all probability be made the basis of a system of registration of the sales of property, as it is already made the basis for the valuation of property; and it is much to be desired that, concurrent with the publication of the maps of each county, the extent of each property should be marked upon it by persons appointed by the Government;† as this would be a most important matter in itself, and as it would enable the statistics to be collected with reference to properties, it would greatly conduce to an accurate valuation of the properties.

In discussing the returns of produce, it will be important to know the various natural and artificial causes which affect the results in the different districts.

Contours.

On the Ordnance maps of Great Britain on the six-inch scale, which have hitherto been published, the levels are recorded by means of what are technically called contours, or lines of equal altitude, following all the sinuosities of the ground. By means of these contours we can readily trace the belts or zones of the country included between given altitudes, and it is important to know to what altitudes the crops of different kinds can be successfully cultivated, and at what altitudes in the different latitudes and districts cultivation ceases. The

* Under any circumstances I would strongly recommend that the persons intrusted with the collection of the statistics should be furnished with copies of the Ordnance maps, which include their districts, and with scales for readily computing the acreage.

† An Act of Parliament should be passed empowering the survey officers to do this, that is, to mark out the extent of each separate property—*not* to investigate titles.

The returns, therefore, should show the amounts of produce in the zones at 500 feet difference of altitude, as these intervals correspond approximately with a decrease of 2° in the temperature.

This can be readily done if the plans with the original notes are sent to the office where the statistical returns are to be collated and discussed; and I have coloured a Plan and prepared a Table on which the results may be given. *See* Contoured Plan.

COUNTY.	ALTITUDE.	TILLAGE.	WOOD.	WATER AND ROADS.	UNCULTIVATED.	TOTAL.
	Feet.					
	500					
	1,000					
	1,500					
	2,000					
	TOTAL Acreage of the County - - -					

From this we should see the decrease of area in the different zones, and the decrease of tillage of each kind with the altitude, till each kind ceased in the different latitudes. Wheat, for example, in Edinburghshire, in latitude 55°* is now cultivated up to the altitude of 1,000 feet above the mean level of the sea: the more perfect system of drainage which has of late been adopted, and the introduction of guano and artificial manures, by which the great labour of getting up farm-yard manure to such altitudes is avoided, has enabled the farmers to accomplish this, which a few years ago would have been, and in many districts still is, thought to be absolutely impossible; and hence it is that there are large districts of country perfectly reclaimable, and upon which capital could be profitably laid out, which are still left almost entirely waste.

Altitude at which wheat is cultivated.

Uncultivated district reclaimable.

We know that there are other causes besides those depending on the altitude and latitude of a place which will modify the necessary conditions for the successful cultivation of any given crop; for if we assume—1st., that the soils are equally fertile, and the farmers equally intelligent and enterprising, the degree of humidity of the air, and the amount of rain that falls in the different districts, will very sensibly modify the conditions; and hence it is highly important to have rain gauges and dry and wet thermometers registered in the different districts; and in the numerous agricultural societies throughout the country and the parish schoolmasters we have a machinery for readily doing this.†

Degree of humidity of the air affecting cultivation.

2d. If we assume the climates the same at equal altitudes in the same latitudes, the nature of the soil, depending on the geological structure of the country, and the influence of the atmosphere on it, will again greatly modify the productive power of the land; and hence I think it should be an instruction to the Government geological surveyors to report upon the character of the soils of the different parts of the country, and, as far as possible, to distinctly map them. Such maps and reports will not only be extremely useful, as indicating the districts under the same conditions as to soil, but they will be also extremely useful in a scientific point of view, in indicating the causes which have produced the great variety in the soils. Such a report and map as I have indicated is quite distinct from what is generally understood by a geological map and report.

Geological surveyors to map and report upon the different soils.

This distinction is strikingly illustrated by contrasting the state of agriculture on the same geological formations in different districts. In the valley of the Forth we have a rich agricultural district lying immediately over a coal field; whilst in South Wales and the northern counties of England the land over the coal fields is in general extremely barren. These districts in the ordinary geological maps are coloured alike; but in truth the greater fertility of the soil in the valley of the Forth depends upon geological formations, such as the "Boulder Clay" and "Drifts," which are not usually mapped at all; whilst in the coal

Valley of the Forth contrasted with other districts.

* In the United Kingdom the mean temperature varies (approximately) 1° in 1° of latitude, or 1° in 70 miles.

† The Duke of Buccleuch has set a noble example in this, by providing instruments and ordering registers to be kept on his Grace's extensive estates.

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coal districts, where such deposits do not exist, the soils are derived from the sandstones of the coal measures, and are as barren as the heath at Aldershot.

Causes of the great fertility and the power of paying very high rents in East Lothian.

In the lower districts of East Lothian the farmer not only has the rich clay as a substratum, but he has ready access to the lime and coal under it, with a rich fishery round the coast, and abundance of sea-weed for manure, and a railway branching through the county, and he is enabled to pay rents which in other districts, without explanation, would appear altogether fabulous. It is but justice, however, to say that the highly intelligent and enterprising farmers of this district well know how to use the advantages they possess; but we cannot properly understand the causes of the different degrees of fertility of the different districts without such information as I have indicated.

I N D E X.

[*N. B.*—In this Index the Figures following the Names of the Witnesses refer to the Numbers of the Questions; those following *App. p.* to the Paging of the Appendix, and the Numerals following *Rep. p.* to the Paging of the Report.]

A.

Accurate Returns. Considerable importance to the farmers, &c. of an accurate knowledge of agricultural statistics, *Torr* 338, 339. 587. 589; *Peirson* 548; *Sandars* 707, 708; *Levi* 823——Great importance of accurate statistics, as shown by the disadvantages consequent on the want of them, *Buckland* 593, 594. 604, 605——Disadvantage of the English agriculturist through the want of accurate statistics, as compared with the foreigner, *ib.* 604——Very great importance of supplying agricultural statistics to the public at the very earliest period of the year, *Levi* 820 *et seq.*——Evils of uncertainty in regard to the produce, *ib.* 820, *et seq.*

Remarks by the Committee upon the great importance of accurate statistics, *Rep. p.* iii——Resolutions upon the subject, *ib. p.* x.

See also *Compulsory Returns.* *Estimates of Produce.* *Farmers or Occupiers.* *Test of Accuracy.* *Voluntary Returns.*

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Agricultural Society. Obstacle to obtaining the returns for England through the medium of the Agricultural Society, *Miles* 805-809.

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Annual Returns. Statement put forward by witness, in 1854, in favour of annual returns for Scotland, *Maxwell* 40——Annual returns further adverted to as being necessary, at all events for some years to come, *ib.* 96, 97——There should be an annual return of the produce and also of the stock, *Peirson* 542–545.

Artificial Manures. Suggested return relative to artificial manures, *Torr* 580.

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Bailieborough Union (Ireland). Successful experiment for the collection of statistics in this union in 1845, *Bowring*, 900.

Ballymoran Townland, Wicklow. Pattern returns of tillage and of live stock for 1855, *App. p.* 173.

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FIRST REPORT

FROM THE

SELECT COMMITTEE

ON

ADULTERATION OF FOOD, &c.;

WITH THE

MINUTES OF EVIDENCE,

AND APPENDIX.

Ordered, by The House of Commons, *to be Printed,*
27 *July* 1855.

Martis, 26° die Junii, 1855.

Ordered, That a Select Committee be appointed on Adulteration of Food, Drinks, and Drugs.

Jovis, 5° die Julii, 1855.

Committee nominated of,—

Mr. Scholefield.
Mr. Charles Villiers.
Lord Claud Hamilton.
Viscount Goderich.
Mr. Knight.
Mr. Sheridan.
Mr. Peacocke.
Viscount Ebrington.
Mr. Alderman Cubitt.
Mr. Kinnaird.
Mr. Otway.
Mr. Swift.
Mr. Gregson.
Mr. Wise.
Mr. Moffatt.

Ordered, That the Committee have power to send for Persons, Papers, and Records.

Ordered, That Five be the Quorum of the Committee.

Veneris, 27° die Julii, 1855.

Ordered, That the Committee have power to Report the Minutes of Evidence taken before them, to The House.

Mercurii, 8° die Augusti, 1855.

Ordered, That the Committee have power to Report their Observations to The House.

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FIRST REPORT.

THE SELECT COMMITTEE appointed to inquire into the ADULTERATIONS of FOOD, DRINKS, and DRUGS, and who were empowered to Report the Minutes of Evidence taken before them from time to time:

HAVE taken Evidence on the Matters to them referred, and have agreed to Report the same to The House.

27 *July* 1855.

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MINUTES OF EVIDENCE.

Veneris, 13° *die Julii*, 1855.

MEMBERS PRESENT.

Mr. Scholefield.	Mr. Kinnaird.
Mr. Sheridan.	Mr. Knight.
Mr. Villiers.	Mr. Moffatt.
Lord Claude Hamilton.	Mr. Otway.
Viscount Ebrington.	Mr. Peacocke.
Viscount Goderich.	Mr. Swift.
Mr. Gregson.	Mr. Wise.

WILLIAM SCHOLEFIELD, Esq., IN THE CHAIR.

Arthur Hill Hassall, M. D., called in; and Examined.

A. H. Hassall, M.D.

13 July 1855.

1. *Chairman.*] YOU are, I believe, a medical man?—I am a Doctor of Medicine of the University of London, and a Member of the College of Physicians of London.

2. Have you devoted a great deal of attention to the consideration of questions of adulteration not only of articles of food and drink, but of drugs and other things?—I have.

3. Is it your opinion that adulteration is very prevalent?—I find adulteration to be exceedingly prevalent; it may be stated generally that it prevails in nearly all articles which it will pay to adulterate, whether of food, drink or drugs. There are but few exceptions to this rule, I think.

4. By that you mean to say that it not only prevails to a wide extent in certain articles, but that the articles are very numerous in which the adulteration is carried on?—The adulterations practised are very numerous, and they are varied both in kind and degree. The majority of adulterations consists in the addition of substances of greatly inferior nature, for the sake of weight and bulk.

5. Mr. *Villiers.*] All the adulterations have an interested purpose, which you are going to speak to?—Yes. Other adulterations consist in the addition of various colouring matters; these are employed either to conceal other adulterations, or to heighten, and, as it is considered, to improve the appearance of articles. Lastly, a few adulterations are practised for the purpose of imparting smell, pungency, or taste to certain articles. Perhaps it will be well that I should state at the outset the nature and extent of the evidence which I am prepared to give to-day. I propose, first, to show the fact of adulteration, and the prevalence of the practice; second, to treat of the sanitary bearings of the question; third, to show the importance of the microscope as a means of discovering adulterations; and, fourth, to suggest such remedies as occur to me for the suppression of adulteration. To prove the fact of adulteration, and the prevalence of the practice, I will, with the permission of the Committee, proceed to read three lists of articles which I have prepared. The first is a list of the various substances which have been ascertained by myself to be employed for different purposes of adulteration. The second is a list of articles ascertained by others to be used for purposes of adulteration; and the third is a list of articles stated to be so employed, but of the use of which no positive evidence has been adduced; although it is extremely probable that many of those substances have been and are occasionally had recourse to for the purpose of adulteration. The following is a classified list of the articles analysed, and the various substances

A. H. Hassall, M.D.

13 July 1855.

List of articles ascertained by myself to be used for adulteration.

ascertained by myself to be employed for the different purposes of adulteration. Annatto is adulterated with chalk, wheat flour, rye flour, salt, and soap for bulk and weight; for colour it is adulterated with turmeric, a ferruginous earth, probably Venetian red and red lead. Arrowroot, East and West Indian, is adulterated with sago, potato, and tapioca starches, and various mixtures and combinations of these with the inferior arrowroots. Anchovies are mixed with Dutch, French, and Sicilian fish, and sometimes those fish are passed off as the anchovy itself; bole armenian and Venetian red are also added to colour the liquid which surrounds the fish. Bread is adulterated with mashed potatoes, alum, "hards," and sometimes, though rarely, with sulphate of copper. Butter, with water. Bottled fruits and vegetables, with certain salts of copper, usually the sulphate or acetate. Cinnamon, with cassia; and most of the articles to be mentioned under spices. Coloured confectionery, with East India arrowroot, wheat and potato flour, hydrated sulphate of lime; and it is coloured with cochineal, lake, indigo, Prussian blue, Antwerp blue, artificial ultramarine, carbonate of copper or verditer, carbonate of lead or white lead, red lead, vermillion, the chrome yellows, or chromates of lead, lemon, orange, and deep gamboge, the three Brunswick greens, Emerald green, or arsenite of copper, Indian red, brown ferruginous earths, chiefly umber, sienna, and Vandyke brown, and various combinations of the above pigments, and also bronze powders. Coffee, with chicory, roasted wheat, rye and potato flours, roasted beans, mangel-wurzel, and a substance resembling acorns. Chicory, with roasted wheat and rye flours, burnt beans, sawdust, mahogany sawdust, carrot, mangel-wurzel; and it is coloured with ferruginous earths, as Venetian red and umber, burnt sugar, sometimes denominated black jack. Cocoa and chocolate, with Maranta, East India, and Tacca or Tahiti arrowroots, tous-les-mois, the flours of wheat, Indian corn, sago, potato, and tapioca, and various mixtures of these, sugar, and chicory; and it is coloured with Venetian red, red ochre, and other ferruginous earths. Cayenne, with ground rice, mustard husk, deal sawdust, salt; and it is coloured with red lead and vermillion, or bi-sulphuret of mercury, Venetian red, and turmeric. Custard and egg powders contain wheat, potato, and rice flours, coloured with chrome yellow, or chromate of lead, and turmeric. Curry powder, with ground rice, potato farina, and salt; coloured with red lead. Flour, with alum. Ginger, with wheat, sago, potato flours, and turmeric powder. Gin, with water, sugar, cayenne, cassia, or cinnamon, and flavourings of different kinds, and for fining, alum and salt of tartar. Rum, with water and cayenne pepper. Isinglass, with gelatine. Lard, with potato flour, water, salt, carbonate of soda, and caustic lime. Mustard, with wheat flour and turmeric. Milk, with water and annatto. Marmalade, with pulp of apple or turnip. Oatmeal, with barley flour, and the integuments of barley, called rubble. Porter and stout, with water, sugar, treacle, and salt. Pickles, with salts of copper, usually the sulphate or acetate of copper. Potted meats and fish, with flour, probably wheat flour boiled, coloured with bole armenian, and sometimes Venetian red. Preserves, with salts of copper, including the acetate. Pepper, with wheat and pea flour, ground rice, ground mustard seeds, linseed meal, P. D. or pepper dust. Snuff, with the chromates of potash, chromate of lead, ferruginous earths, chiefly umbers, red and yellow ochre, red lead or oxide of lead, carbonate of ammonia, lime, powdered glass or silex, and powdered orris root. In sugar, wheat flour was found in two cases only; it is but rarely adulterated; potato flour and tapioca starch were also each found in one case. Cinnamon is adulterated with cassia, wheat flour, sago meal, and mixtures of these, East India arrowroot and potato flour. Pimento, with mustard husk, in one instance. Mixed spice, with wheat, sago, and potato flours, ground rice, and two vegetable substances, one of which resembled linseed. Sauces, such as the essences of anchovies, lobsters and shrimps, and tomatto sauce, with red ferruginous earths, as bole armenian and Venetian red. Tea, with exhausted tea leaves, leaves other than those of tea, British and foreign; among the former, those of sycamore, horse-chesnut, and plum; with lie tea, paddy husk, sand, and starch; coloured with plumbago or blacklead, gum, indigo, Prussian blue, turmeric, Chinese yellow, China clay, and soap-stone or French chalk; and it is flavoured with sulphate of iron, catechu gum, la veno beno, and Chinese botanical powder. Tobacco, with water, sugar, treacle, and salts of various kinds. Vinegar, with water, burnt sugar, and sulphuric acid. Jalap, with powdered wood of two different kinds. Ipecacuanha, with chalk, wheat flour, powdered woods, and other vegetable substances. Opium, with poppy capsules,

capsules, wheat flour, sugar, gum, powdered wood, and sand. Scammony, with wheat flour, chalk, resins of guaiacum and jalap, sand, and woody fibre. This list does not embrace nearly all the substances employed in the adulteration of articles of food, drink and drugs especially; it contains those only, as already remarked, which have actually been discovered by myself in the several articles subjected to analysis up to this time.

6. *Chairman.*] Many of those articles are not simply adulterations of an innocuous character, but they are many of them injurious to health, and some of them even poisonous?—I think there can be no question but that that is the case. I shall hereafter have evidence to give bearing upon the question as to whether adulteration really affects health injuriously or not.

7. Mr. *Villiers.*] Can you state how you have detected those adulterations?—Partly by means of the microscope, and partly by chemistry; the greater proportion of the adulterations have been detected by the microscope, and particularly where they have consisted in the addition of any vegetable or other substance having size or structure sufficient to characterise it.

8. Mr. *Swift.*] That is a somewhat novel application of the microscope, is not it; to this purpose, at least, it is a much more extensive application of it than has been before contemplated?—It is; indeed it was not known that the microscope was so generally applicable to the subject of adulteration as it proves to be.

9. Mr. *Villiers.*] You state the fact of these adulterations with confidence; you have no doubt of the accuracy of the tests which were applied?—There can be no question whatever upon this point. The results have been published from time to time, in connexion with the names of the parties from whom the different articles were purchased; if, therefore, there had been any general inaccuracy in the results, it cannot be questioned for a moment but that some of those parties would have proceeded to show any error in the statements made. The statements were made regularly during a period of four years, and involved the publication of the names and addresses of many hundreds of manufacturers and traders.

10. *Chairman.*] Were not there some very careful means resorted to in the purchase of the articles for examination during those investigations, so as to make it almost impossible that there could be any mistake?—The method pursued was this. Two persons in whom confidence could be reposed, were sent out to purchase the articles which it was proposed to take in hand and to analyse. Immediately on each purchase the name and address of the party was placed on the wrapper containing the article bought, with the date and the initials of the persons purchasing. I may state that, feeling the great responsibility resting upon myself, and in order to insure the greatest accuracy, I nearly always accompanied the purchasers of the articles, and saw that there could be no mistake or error committed.

11. Lord *C. Hamilton.*] I suppose you do not give any result unless you have verified it by testing a great number of samples taken from a variety of shops, always buying what may be called the commercial article, what was exposed for general sale?—Usually 20, or 30, or 40 samples of the same article were subjected to examination before any report was drawn up upon them.

12. You do not give the Committee any result, unless you have tested a great variety of samples?—It is very seldom that the statement as to the adulteration of any substance rests upon the examination of one sample.

13. *Chairman.*] The purchases were made, were not they, in a very impartial manner. I believe almost every shop in the particular streets to which you went to make your purchases, was visited with a view to as impartial a distribution of your examination as possible?—In some cases this plan was adopted. All the shops of one particular kind, on one side of the street, were visited first, and on returning up the street the shops on the other side were taken.

14. In fact, those samples were samples not selected for any special purpose, but they were selected from different traders of the town, in the impartial manner in which you have stated?—Yes. In some instances, traders were selected of all classes purposely, in order to test the fact as to the extent to which adulteration prevailed. The most respectable traders were often taken who dealt in certain articles, and then those living in more frequented and populous parts of the City.

15. Mr. *Villiers.*] No information, I presume, was given to the traders of the

A. H. Hassall, M.D.

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purposes for which you required the articles?—No, the purchase was made in the ordinary way, by simply asking for the articles I desired to be furnished with. The next list is one of articles ascertained by others to be used for the purpose of adulteration. This list has been compiled partly from an examination of different works and papers which have been published on the subject of the adulteration of different articles of food, and partly from proceedings which have been reported of the Excise from time to time. Bread has been ascertained to be adulterated with sulphate of copper. Coloured sugar confectionery, with sap green. Flour, with mineral white, or hydrated sulphate of lime. There have been several cases recently reported in the newspapers, of the adulteration of flour by millers with that substance. Gin is adulterated with grains of paradise, sulphuric acid, various gin flavourings, containing coriander seeds, angelica root, calamus root, almond cake, orris root, cardamom seeds, orange peel, and grey and white salts. Lard is adulterated with mutton suet, alum, and potash; milk and cream with flour or starch, and treacle; porter and ale with cocculus indicus, grains of paradise, capsicum, ginger, quassia, wormwood, calamus root, caraway and coriander seeds, orange powder, liquorice, honey, sulphate of iron, sulphuric acid, cream of tartar, alum, carbonate of potash, oyster shells, hartshorn shavings, fabia amara or nux vomica, and beans for fining. In snuff, quassia, gentian and Colombo root, peat, moss, earthy matter, rhubarb leaves, leaves of trees, and fustic wood have been discovered. Tea is mixed with the leaves of beech, plane, bastard plane, elm, poplar, willow, fancy oak, hawthorn, and sloe, and is coloured with rose pink, Dutch pink, vegetable red and yellow dyes, chrome yellow, Venetian red, carbonate of copper, arsenite of copper, chromate and bi-chromate of potash, and carbonates of lime and magnesia. Tobacco with rhubarb, potato, coltsfoot, dock and other British leaves, sawdust, malt comings, earthy matter, sand, and nitrate of soda. The third list is the articles stated by others to be employed for the different purposes of adulteration, but of the use of which no positive evidence has been adduced, although it is extremely probable that many of them have been or are occasionally had recourse to. In arrowroot, ground rice; in anchovies, sprats; in bread, barley, oat, rye, Indian corn, bean and pea flours, potato starch, pipeclay, plaster of Paris, and bone-dust. In coloured confectionery, white potters' clay, pipeclay or Cornish clay, chalk, plaster of Paris, and sand, coloured with cobalt, smalt, and ultramarine. In coffee, roasted peas, coffee grounds, parsnip, and madder root. In chicory, torrified ground rice, roasted biscuit, oak bark tan, exhausted tan called croats, baked horses' liver, burnt blood, litmus, and Naples yellow. In cocoa and chocolate, cocoa-shells, old sea biscuits, coarse branny flour, animal fats, as tallow or lard, treacle, sulphate of lime, and chalk. Flour with rye, Indian corn, rice, bean and pea flours, potato starch, chalk, bone earth, plaster of Paris, and powdered flints. In gin, acetate of lead. In litmus, common arsenic and peroxide of mercury. In mustard, pea flower, linseed meal, and raddish seeds. In milk, sheep's brains and chalk. In pepper, ground oilcake and clay. In raspberry jelly and currant jelly, orris root. In sugar, sand and plaster of Paris. In sauces, chalk, plaster of Paris, and red lead. In tobacco, the leaves of cabbage, sea-weed, roasted chicory root, bran and oakum, liquorice, beet-root dregs, fuller's earth, sal ammoniac, carbonate of ammonia, nitrate of ammonia, salt, alkalies, as potash and soda, catechu or terra japonica, and opium. In vinegar, acetic, pyroligneous, hydrochloric, nitric, and tartaric acids, cayenne, long pepper, mustard seeds, and salt. The principal conclusions arrived at from the examination of some of the more important articles referred to in the preceding lists may now be stated a little more in detail, in order to convey a clearer idea of the extent and character of the adulterations which are practised. The tables consist of a mere enumeration of the names of the articles analysed and the substances found in them; they do not convey any idea of the frequency with which the several articles are employed. With respect to coffee and its adulterations, the conclusions resulting from the microscopical examination of the first series of samples of *ground coffee* subjected to analysis were as follows:—That 34 coffees, with three exceptions, were adulterated; that chicory was present in 31 instances; roasted corn in 12; beans and potato flour each in one case; that in 16 cases the adulteration consisted of chicory only; that in the remaining 15 samples, the adulteration consisted of chicory, and either roasted corn, beans, or potato flour; that in many instances the quantity of coffee present was very small;

List of articles ascertained by others to be used for adulteration.

List of articles stated to be used.

Coffee.

small; and in others not less than one-fifth, fourth, third, half, and so on, of the whole article. From a second series of samples examined at the same time, the conclusions were, that 18 out of the 20 samples were adulterated with chicory, and that four of the samples contained roasted corn in addition to chicory. The conclusions resulting from another series of examinations were, that out of the 42 samples of coffee submitted to analysis 11 were unadulterated; that the remaining 31 samples were all adulterated with chicory, which was met with in every proportion, in many cases constituting the chief part of the article; that in two cases only was any other adulteration than that with chicory observed; one consisting of a vegetable substance resembling horse-chestnut, and the other of some amorphous substance, probably used for colouring.

16. Mr. *Villiers.*] Was that an examination made in the present year?—No, it was at the commencement of the investigations which were published in The Lancet more than four years ago. The conclusions resulting from an examination of *canister coffee*, were, that the whole of the 29 packages, bottles, and canisters of coffee submitted to analysis, with a single exception, were adulterated: that in 28 of the samples the adulteration consisted of chicory; this root in many instances constituting the chief part of the article: that five of the coffees contained roasted wheat-farina, and substances bearing a close resemblance to mangel-wurzel and acorn. The conclusions deduced from the examination of another series of analyses of samples of coffee made at a later period were, that out of the 20 samples of coffee submitted to examination 19 were adulterated with chicory: that several of the samples on incineration left a coloured residue from the presence of red oxide of iron, derived from some red ferruginous earth, as Venetian red, employed in the adulteration of the chicory contained in the coffee. The conclusions deduced from the examination of 34 samples of coffee purchased shortly after the recent regulation authorising the sale of mixed chicory and coffee in labelled packages were, that out of the 34 samples all purchased as coffee, only three were genuine, while no less than 31 contained various proportions of chicory; that in six of the samples chicory was present in the proportion of about one-third of the article; that in 22 of the samples chicory formed about one-half of the article; that three of the samples consisted almost entirely of chicory; that 13 of the samples were not labelled "Mixture of chicory and coffee," and yet 10 of these were adulterated with chicory; that the remaining 21 samples, notwithstanding that coffee was distinctly asked for in each instance, were labelled "Mixture of chicory and coffee." The results obtained by the examination of 34 samples of ground coffee purchased a few days subsequently at the same establishments from which the previous 34 samples were procured, were as follows: that of the 34 samples all purchased as coffee, 9 were genuine, while no less than 25 contained various proportions of chicory: that in eight of the samples chicory was present in the proportion of about one-third of the article; that in 14 of the samples, chicory formed about one-half of the article; that three of the samples consisted almost entirely of chicory; that two of the samples were not labelled "Mixture of chicory and coffee," and yet were adulterated with chicory, the parties (the adulteration being brought home to them) being liable in each case to a fine of 100*l.* Of the 25 samples containing chicory, notwithstanding that coffee was distinctly asked for in each case, 23 were labelled "Mixture of chicory and coffee." Contrasting these two tables of analyses, it appears, therefore, as consequences of the previous report, that greater caution is now observed in the sale of mixed chicory and coffee without a label, an offence punishable by a fine of 100*l.*; also that a larger proportion of dealers sell the genuine article when asked for it, but that the "mixture" is still palmed off as extensively as ever upon the public as coffee. The results of the examination of 10 additional samples purchased as coffee, were as follow: Two were sold as coffee, being labelled "Mixture of chicory and coffee;" one was sold as a mixture of chicory and coffee, which it really was; and seven were genuine. I now come to *sugar* and its adulterations. From the examination of 36 samples of brown sugar, the conclusions arrived at were, that fragments of cane, frequently so minute as to be visible only with the microscope, were detected in all the sugars except one, that being a very white sugar, and evidently purified by filtration, so as to cause it to approach in character refined or lump sugar; that the disgusting insects acari were present in 35 out of the 36 sugars, and in 19 cases in very considerable numbers; that sporules and filaments of fungi were present in at least 10 cases; that

SUGAR.

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grape sugar was detected in the whole 36 sugars, often in very considerable amount; that the whole of the sugars contained a variable proportion of vegetable albumen; that a greater or less number of pieces of woody fibre were noticed in nearly all the sugars; that stony particles or grit were observed in at least 11 instances; that a variable quantity of starch or flour was contained in each sample of sugar, either in the form of free granules or aggregations of granules and cells; that in four of the sugars the amount of flour was so considerable that it had evidently been employed for the purpose of adulteration. The results obtained from the examination of 15 samples of lump sugar were, that in none of the sugars were fragments of cane present, these having been separated by the filtration through charcoal to which sugar in process of refinement is subjected; that in no case were acari observed; that in three of the sugars only were traces of grape sugar to be detected; that in none of the sugars were sporules of fungi to be seen; that a variable although a very small quantity of flour was present in the whole 15 sugars; that animal matter was observed in 10 cases; that sawdust, like fragments of woody fibre, were present in 12 cases, being very abundant in at least seven of the sugars. From the examination of a second series of brown sugars, purchased more recently at different shops, the conclusions were, that the sugar insect or acarus was present in the whole of the sugars, the majority of the samples containing them in great numbers; that sporules of fungi were likewise present in all the sugars; that two out of the 36 sugars were adulterated with flour, one with tapioca, and the other with potato flour. The next article that I will speak of is *arrowroot*: the conclusions were, that out of the 50 samples of arrowroot submitted to analysis, 22 were adulterated; that in 16 cases the adulteration consisted in the addition of a single article, much cheaper in price and very inferior in quality to genuine arrowroot; this, in 10 instances, being potato flour, in five sago meal, and in one case tapioca starch; that in five cases it consisted in the employment of two different articles, potato flour and sago meal; that in two instances three different starches were employed in the adulterations, viz., potato flour, sago meal, and tapioca starch or fecula; that 10 of the arrowroots contained scarcely a particle of genuine maranta or West India arrowroot, for which they were sold. One consisted entirely of sago meal; two of potato flour and sago meal; two of potato flour, sago meal, and tapioca starch; one of tapioca starch; and four were composed entirely of potato arrowroot or starch. From the examination of a second series of samples of arrowroot the conclusions were, that no less than 18, or one-half of the samples, were either adulterated or else some inferior starch, as potato flour, was substituted for the genuine arrowroot; that five of the samples consisted almost entirely of potato starch; that the remaining 13 samples consisted of mixtures, in various proportions, of potato starch and sago powder (these, in some cases, forming the chief part of the article), with occasionally other starches, as tapioca, canna, and curcuma starches.

ARROWROOT.

17. *Chairman.*] The article of arrowroot is one which is commonly used by invalids, is it not; and therefore it is very important that it should be pure?—It is an article which is very extensively used, not only amongst invalids, but in the feeding of children. In the case of arrowroot, I do not know that it is so much a matter of health that the article should be pure, as it is a question of profit and loss, since the articles employed in the adulteration of arrowroot resemble in their nutritious properties to a great extent genuine arrowroots. From the examination of 43 samples of black and white *pepper*, the conclusions were, that more than half the peppers purchased previous to some recent convictions by the Excise were adulterated; that a much less though still a considerable proportion of the samples procured subsequent to those convictions were likewise adulterated; that the adulteration practised consisted in the addition of wheat flour in four cases, of pea flour in one, ground rice in two, of powdered mustard seeds in four, of linseed meal in three, and of P. D. or pepper dust in two instances. As to *mustard*, the conclusions resulting from the examination of the various samples of this article were, that genuine mustard, whatever be the price paid for it, is scarcely ever to be obtained; that the whole of the 42 samples submitted to examination were adulterated; that the adulteration practised in every case was the same in kind, varying only in degree, and consisted in the admixture of genuine mustard with very large quantities of wheaten flour, highly coloured with turmeric.

PEPPER.

MUSTARD.

18. Is not mustard used not only as a condiment, but very largely by medical men

men in many extreme cases, sometimes in cases of apoplexy?—It is used principally in medical practice as an outward application in the form of cataplasms.

19. Is not it used internally sometimes?—It is used to act as an emetic.

20. Would the adulterations you speak of materially affect the utility of mustard in its medical appliance?—They would to a great extent.

21. Are you aware whether adulteration has been so generally practised as to compel the Government to make its mustard at a manufactory of its own?—I remember that circumstance to have been stated. The conclusions in the case of *chicory* deduced from the examination of 34 samples were, that 14 were adulterated; that in nine the adulteration consisted of roasted corn; that scorched beans were present in four of the samples; that in one case a substance resembling ground acorn was detected. From the examination of a second series of samples of chicory, 23 in number, the conclusions were that 11, or one half of the samples, were adulterated; that four were adulterated with roasted wheat; that the substance like ground acorn was present in an equal number of cases; that two of the samples contained sawdust, and one mahogany sawdust; that mangel wurzel was detected in one of the chicories; that in one instance roasted carrot was present. The result of the microscopical examination of some other samples of chicory, both as purchased and as obtained from manufacturers, were, that out of the 18 samples of chicory procured from manufactories, five were adulterated with roasted wheat flour; that several of the samples yielded a coloured ash; that out of the 16 samples of chicory purchased at the establishments of different grocers in the metropolis one only was adulterated with roasted farina; that the ashes of several of the samples were highly coloured, indicating the presence of some red ferruginous earth, as Reddle and Venetian red. In the case of *bread*, the conclusions were, that the whole of the 24 samples of bread examined were adulterated with alum; that in no one of the samples was potato or any other farinaceous matter, other than wheat flour, detected; nor did any of the breads contain either carbonate or sulphate of lime. From the analysis of a second series of samples of bread, made more recently, the conclusions were, that the whole of the 25 samples examined, including three sold by the League Bread Company, contained alum; that in none of the samples was potato detected. From the examination of eight samples of *flour*, the important fact was ascertained, that four of the flours used by the bakers in whose bread alum had been detected, and who had questioned the accuracy of the analysis, also contained alum. The conclusions arrived at from the analysis of samples of *cocoa* were, that eight of the 56 samples were genuine; that sugar was present in 43 samples, the amount forming from five to, in some cases, as much as nearly 50 per cent. of the article; that starch was detected in 46 of the samples, the quantity present varying from five to nearly 50 per cent., and consisting either of wheat, potato flour, sago, meal, &c., or mixtures of these in various proportions. The conclusions to be deduced from the examination of the analysis of the above 56 different samples of cocoa were as follows: that out of the 10 samples of flaked cocoa which were incinerated, six contained earthy colouring matter; that one of the two samples of granulated cocoa yielded a coloured ash; that two of the three bromas contained earthy colouring matter; that out of 14 samples of soluble cocoa, earthy colouring matter was discovered in 13; that five of the 14 homœopathic cocoas contained coloured earth; that the two roll cocoas were free from earthy colouring matter; that earthy colouring matter was present in seven of the nine samples of rock cocoa examined; that the ash in one of the two cocoa pastes incinerated was coloured; that of the 12 samples of chocolate, in powder and in cake, examined, earthy colouring matter was present in four; that out of 68 samples of cocoa and chocolate submitted to examination, 29 were free from admixture with earthy colouring matter, while the remaining 39 samples all contained coloured earthy substances in greater or less amount. With respect to *oatmeal*, the conclusions resulting from the examination of this article were, that 16, or more than one half, of the 30 samples submitted to examination, were adulterated with large proportions of barley meal, while others contained the refuse husk, termed rubble.

Chicory.

Bread.

Flour.

Cocoa.

Oatmeal.

22. Was not there a case at Tooting some years ago which brought out very strikingly the effects of adulteration in the article of oatmeal?—There was. I very distinctly remember some of the circumstances connected with that case; it was the case in which so many pauper children died at one time in the establishment at Tooting. One fact, which came out in the course of the coroner's

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inquiry, was, that the oatmeal was very largely adulterated with barley meal, and it was considered that this adulteration might have had a great deal to do with the illness of the children. The children, as far as I recollect, were all suffering with nearly the same symptoms; they were reduced by diarrhœa; and it was thought that the barley meal, having a somewhat aperient property, and having been in daily use, might have been the cause of the diarrhœa.

23. Mr. *Peacock.*] Was that an adulteration on the part of the tradesman from whom it was purchased, or on the part of the governors of the institution? —I cannot say. I now proceed to the conclusions arrived at from the analyses of the different samples of *black* and *green tea*, both as imported and as purchased of dealers in this country. The chief points ascertained with regard to black tea were, that the principal black teas (viz. the congous and souchongs) arrive in this country for the most part in a genuine state; that certain descriptions of black tea, as scented orange pekoe, and caper, are invariably adulterated; the adulteration in general consisting in the glazing of the leaves with plumbago, or black lead; the caper likewise being subject to admixture with other substances, as paddy husk, lie tea, and leaves other than those of tea; that several varieties of a spurious caper, or black gunpowder, are prepared, which consist of tea-dust, and sometimes the dust of other leaves, and sand, made up into little masses with gum, and faced or glazed with plumbago, Prussian blue, and turmeric powder. In some cases these imitations are sold separately, but most frequently they are used to mix with and adulterate the better qualities of caper, viz. those which are made of tea faced with plumbago only. With respect to green tea, the principal conclusions were, that these teas, with the exception of a few of British growth and manufacture, from Assam, are invariably adulterated; that is to say, are glazed with colouring matter of different kinds.

Tea.

24. Mr. *Villiers.*] Do those teas come pure into this country?—The Assam teas are all uncoloured, even those which profess to be green teas.

25. Mr. *Swift.*] With reference to the black teas you have described to be adulterated, do you mean that they were adulterated before they came here or after?—Those adulterations were practised, unfortunately, by the Chinese.

26. When you said that certain black teas arrived here in a pure state, you only alluded to the classes you mentioned first?—The congou and the souchong kinds, which constitute the great bulk of the black tea consumed in this country.

27. Mr. *Sheridan.*] Have you been able to discover an undulterated sample of tea?—All the souchongs and congous from China arrive in a genuine state. The green teas, as I have said, with the exception of a few from Assam, are invariably adulterated, that is to say, are glazed with colouring matters of different kinds. The colouring matters used are in general Prussian blue, turmeric powder, and China clay, other ingredients being sometimes but not frequently employed. Of these colouring matters, Prussian blue, or ferro-cyanide of iron, possesses properties calculated to affect health injuriously. In this country there is really no such thing as a green tea; that is, a tea which possesses a natural green hue. Green teas, and more especially the gunpowders, in addition to being faced and glazed, are more subject to adulteration in other ways than black teas, as by admixture with leaves not those of tea, with paddy-husk, and particularly with lie tea. That lie tea is prepared so as to resemble green tea, and is extensively used by the Chinese themselves to adulterate gunpowder tea; it is also sent over to this country in vast quantities, and is employed for the same purpose by our own tea-dealers and grocers. In many cases I have been informed that it is marked lie tea by the Chinese themselves.

28. *Chairman.*] What is lie tea?—It is a spurious article, made up with a certain proportion of tea dust, gum, and sand; it is formed into little masses, and those are afterwards faced with Prussian blue or indigo, turmeric and China clay; it is an article expressly manufactured for the adulteration of tea.

29. Viscount *Ebrington.*] What is China clay?—It is a white clay, forming a very fine powder, which gives a smoothness and gloss to the leaves. I have given above the more important conclusions as to the condition of black and green teas, as imported; but these articles undergo further deterioration in our own country. Thus, in my work on food, I have adduced evidence to show that exhausted tea leaves are frequently made up with gum, &c., and resold to the public as genuine black tea; and when artificially coloured and glazed, even as green tea. This fact is well known to the Excise, who have instituted proceedings in cases of the kind referred to. The substances employed in the colouring

colouring are, in many cases, very much more objectionable and injurious than those used by the Chinese, being often highly poisonous. It is no uncommon thing for tea, both black and green, to be fabricated from leaves not those of tea, and possessing no properties in common with the leaves of that plant. Again, black lie tea is often coloured, and extensively employed by our own dealers and grocers for the adulteration of green tea. With regard to the adulterations practised on tea in this country, I may here refer incidentally to a prevailing error. Many persons are in the habit, especially ladies, of examining the leaves coming from the teapot, expecting to find the whole leaves of some British plant, such as the plum or the sloe. I have never met with a single instance of the presence of any entire leaf except tea leaf in the teapot. When British leaves are used, they are prepared in a special manner. They are broken up into a powder, mixed with catechu and gum, and formed into little masses in the same way as the Chinese fabricate them, and then they are mixed with genuine tea, especially gunpowder. When hot water is added to those masses, the catechu and the gum are dissolved by the hot water, and nothing remains but the leafy matter at the bottom of the teapot.

30. Mr. *Villiers.*] That is a peculiar preparation of the leaf of some British plant?—Yes, for the special purpose of adulteration.

31. They never sell this adulterated matter exclusively as tea, do they?—They certainly would not sell it except to one in the trade, and to be used with a certain proportion of genuine tea for the purpose of adulteration. I now come to the article of *milk*. The conclusions deduced from an examination of 26 samples of milk purchased of different milkmen and dairy-keepers resident in London, were that 12 were genuine. That of these, two showed a deficiency of cream; that 11 were adulterated; that this adulteration consisted in all cases of water, the per centage of which varied from 10 to 50 per cent. or one-half of the article. That in no case was chalk, size, gum, sheep's brains, or any of the other substances said to be occasionally used for the adulteration of milk detected.

MILK.

32. Viscount *Ebrington.*] Have you analysed any samples of cream?—I have only examined a small number of samples of cream from time to time. I have never found any adulteration in cream as yet; but I have not made any special inquiries on the same scale that I have in the case of milk. Annatto is commonly added to cream to give it a little additional colour. With respect to *isinglass*, the conclusions were, that out of the 28 samples of isinglass submitted to examination, 10, or more than one-third, consisted entirely of gelatine. That the price paid for the genuine isinglass varied from 8*d.* to 1*s.* 4*d.* per ounce, while that paid for the gelatine ranged between 10*d.* and 1*s.* 4*d.* per ounce. With respect to *vinegar*, the conclusions resulting from the examination of 33 samples purchased of grocers, oilmen, and publicans were, that the amount of acetic acid, the most important constituent of vinegar, varied greatly in different samples, the highest per centage being 5·10, and the lowest 2·29, or less than half the first amount. That since the standard No. 24 vinegars submitted to analysis range for the most part considerably over four per cent., vinegar to be deemed good ought to contain certainly not less than four per cent. of real acid. Judged by this standard, out of 23 samples of vinegar purchased of dealers in London, seven reached this strength, and contained from four per cent. upwards of acetic acid; the per-centage of seven of the vinegars ranged between three and four, while in the remaining nine the amount of acid varied from two to three per cent.; it being, in two instances, as low as 2·40 and 2·29. That 12 samples out of the 33 analysed, contained no free sulphuric acid; a fact affording convincing proof that the use of this acid, so objectionable in many respects, is not necessary for the preservation of well-made vinegar. That in eight samples, the quantity of sulphuric acid present did not exceed the amount formerly permitted to be added. That in the remaining cases, the amount exceeded this, and in some instances was three or four times as great. Since the manufacturers prepare and sell vinegar of different qualities, some being very weak, and since, as is well-known, they commonly add sulphuric acid, it is clear that the blame of the present unsatisfactory condition of the article lies mainly with them; although, no doubt, in some cases, the retailer takes his part in the work of adulteration and deterioration by the addition of sulphuric acid, burnt sugar, water, sour beer, and cider. The conclusions resulting from the examination of a second series of samples of the vinegars of the

ISINGLASS.

VINEGAR.

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principal manufacturers, 28 in number, were as follows: that seven of the samples were entirely free from sulphuric acid or oil of vitriol; that 21 were adulterated with that powerful and corrosive mineral acid, the amount of which was variable, and often very considerable, from ·63 the lowest, to 6·02 the highest quantity in 1,000 grains; that two of the samples contained it in very small quantity only; that in three samples it was present in considerable amount; that nine contained it in very considerable amount; that in seven samples it was present in immense quantity. That the acetic acid also varied very considerably in amount in different samples, the highest proportion being, in 1,000 grains by measure, 56·66 grains, or 5·66 per cent., and the lowest 27·63, or only 2·76 per cent.; that in eight samples the acetic acid was present in amount over five per cent., which is above the standard strength; that in 12 samples the quantity exceeded four per cent.; that in seven it was over three per cent.; that in one the quantity of acetic acid present was so exceedingly small as to be under three per cent., that is but little more than half the proper strength. The conclusions deduced from the

Pickles.

examination of samples of *pickles* were, that 19 out of the 20 samples of pickling vinegar submitted to analysis owed a portion of their acidity to sulphuric acid, amounting in some of the samples to over two and a half grains per thousand; the largest quantity of this acid was detected in pickles of red cabbage; that in the whole of the 16 different pickles copper was present; two of the samples contained it in a small amount, eight contained rather much of it, one a considerable quantity, three a very considerable quantity; and in one copper was present in an amount deleterious; and in two, in amounts which might be almost considered to be poisonous. The pickles which contained the largest quantity of copper were those which consisted entirely of green vegetables, as gherkins

Ginger.

and beans. The conclusions in the case of ground *ginger* were, that out of 21 samples of ginger submitted to examination, no less than 15, being more than two-thirds of the whole, were found to be adulterated; that the substances detected were various in character, including sago meal, potato flour, wheat flour, ground rice, Cayenne pepper, mustard, husks, and turmeric powder; these occurring in various quantities, but in the majority of cases constituting the principal part of the article. The conclusions deduced from the examination of

Cinnamon.

31 samples of *cinnamon* were, that of the whole cinnamons seven were genuine, and five consisted of nothing but cassia. That while the prices per ounce for the whole cassias varied between 6*d.* and 1*s.*, one being charged 6*d.*, three 8*d.*, and one 1*s.*; those for the cinnamon also varied between 6*d.* and 1*s.*; one being charged 6*d.*, three 8*d.*, and three 1*s.* That out of the 19 samples of ground cinnamon, three consisted entirely of cassia; that 10 of the samples, or more than one half, were adulterated, the articles most frequently employed being either baked wheat flour or sago meal, separately or in combination; but East India arrowroot and potato flour were likewise detected, each in one instance. That of the above adulterated samples, three consisted of cassia adulterated; and seven of cinnamon adulterated. That six only of the 19 samples were genuine. That the prices given per ounce for the powdered cassia substituted for cinnamon were 6*d.* and 8*d.*; one being 6*d.*, and two 8*d.* That the prices paid for the genuine powdered cinnamon were 6*d.*, 8*d.*, and 1*s.* per ounce; two being 6*d.*, three 8*d.*, and one 1*s.* That the prices charged for the adulterated articles, whether cassia or cinnamon, were, 4*d.*, 6*d.*, and 8*d.* per ounce; viz. one at 4*d.*, three at 6*d.*, and six at

Nutmegs.

8*d.* With respect to *nutmegs*, the conclusions arrived at from the examination of 18 samples of nutmegs were, that nutmegs, as they reach the consumer, are not in general deprived of their essential oil, a result contrary to the opinion commonly entertained on this point: that as met with in the English markets they are

Mace.

seldom limed. As to *mace*, the conclusion was that the whole of the 12 samples examined were genuine. The conclusions deduced from the examination of 29

Cloves.

samples of *cloves* were, that whole cloves, as ordinarily met with, are not deprived of any portion of their essential oil; that the whole of the powdered cloves were free from adulteration; one of the samples contained, however, a

Pimento.

proportion of ground clove stalks. With respect to *pimento*, the conclusions were, that of the 21 samples of ground allspice submitted to examination one only was adulterated, a result mainly attributable to the great cheapness of

Mixed Spice.

this spice. As to *mixed spice*, the conclusions were, that the 26 samples of mixed spice subjected to microscopic examination, no less than 16, or considerably more than one-half, were adulterated; and hence it is seen, that of all the spices,

Cayenne.

mixed spice is the most liable to adulteration. With respect to *Cayenne*, the

the conclusions deduced were, that out of the 28 samples subjected to analysis, 24 were adulterated; that out of the above number, four only were genuine. That out of the 24 adulterated samples, 22 contained mineral colouring matters; that red lead, often in large and poisonous quantities, was present in 13 samples; that Venetian red, red ochre, or some other analogous ferruginous earths, were contained in several samples; that cinnabar, vermillion, or sulphuret of mercury, was detected in one sample; that six of the samples consisted of a mixture of ground rice, turmeric, and Cayenne, coloured with either red lead, or a red ferruginous earth; that six samples contained large quantities of salt, sometimes alone, but more frequently combined with rice and a red ferruginous earth, or with red lead; that one of the samples was adulterated with a large quantity of the husk of white mustard seed; that two contained rice only, coloured with red lead or a ferruginous earth.

33. Do you know whether red lead is ever employed in such quantities as to be apt, in the case of those who eat a great deal of Cayenne pepper, to produce any of the symptoms known to be caused by the absorption of lead into the system?—I am not acquainted with cases of the kind, but I am satisfied that red lead is often present in Cayenne in amount sufficient to produce that effect, provided the Cayenne be taken at all consecutively, two or three times a week, for instance. Snuff is adulterated with another preparation of lead, chromate of lead, and not to a larger extent than red lead is present in Cayenne, and several cases have been recorded recently of the production of paralysis by the use of snuff containing lead; now, if snuff, which merely passes up the nostrils, will give rise to paralysis, it is extremely probable that Cayenne will do so when introduced into the stomach, especially when taken in curry powder, in which far larger quantities are consumed than when taken alone.

34. *Chairman.*] Is not it the fact that the effects of red lead upon the system are cumulative, and that it is not discharged from the system very easily?—That is the case. This remark applies especially to the case of lead and mercury, and with less force to all the other metals which are partaken of. None of the metals are easily expelled from the system; they are all apt to accumulate, but lead of any kind, and mercury, are particularly liable to accumulate, and often do so.

35. A person who was a great consumer of Cayenne pepper might accumulate a large portion of red led in his system?—He might; and he might find his health very much disturbed, even though the symptoms did not go to the extent of paralysis.

36. Have there not been several cases which are well attested, showing the effects which have been produced in all probability by the use of snuff and Cayenne pepper?—Of snuff, undoubtedly; but as to Cayenne pepper, we are without satisfactory evidence as yet, I think, owing to the fact that the subject has not yet received much attention. It has not been known till lately that Cayenne has been adulterated with red lead to the extent it is. But now that attention is directed to it, I have no doubt cases will be recorded, showing the injurious effects which result from that adulteration. I have known serious illness to result from taking curry powder adulterated with red lead, and which lead, no doubt, was introduced into the article through the Cayenne entering into the composition of the curry powder.

37. Mr. *Swift.*] Is the adulteration practised by traders in this country?—It is. The great object of the adulteration is this: Cayenne pepper, in many cases, is exposed to the light of the sun in shop windows, and it is very apt from that exposure to lose its colour. If any mineral colouring matter be used, the Cayenne will stand exposure, and not appear to fade. It really does fade; but then the colouring matters added make up for the deficiency of colour.

38. Is the natural colour of red pepper a bright colour?—It is somewhat bright; but not very bright; it is not so bright as many samples of adulterated cayenne are.

39. When we see particularly red pepper, is there not always good reason to suspect it is not very genuine?—It is a suspicious circumstance in itself, but it is not conclusive, because the addition of salt to cayenne pepper heightens its colour in a very remarkable manner, and makes it more vividly red than even red lead would do. Much of the red pepper which is imported in a ground state from India contains salt. The conclusions arrived at from the examination of 26 samples of *curry-powder* were, that seven only were genuine; that 19, or nearly

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nearly four-fifths, were adulterated; that ground rice, usually in very large quantities, was present in nine samples; that potato farina was detected in one sample; that salt was present in eight of the samples; that the highly poisonous metallic oxide, red lead, was detected in no less than eight of the samples; that in seven of the samples, the adulteration consisted of ground rice only; that in one sample the adulteration consisted of ground rice and salt; that in one sample the adulteration consisted of ground rice and red lead; that in three samples the admixture consisted of salt only; that in three samples the adulteration consisted of salt and red lead; that in three samples the adulteration consisted of red lead only; that in one sample the adulteration consisted of red lead, potato farina, and salt. With respect to *bottled fruits* and *vegetables*, the conclusions were, that of 33 samples of preserved fruits and vegetables, seven were free from contamination with copper; that 27 samples were more or less impregnated with that metal, that traces of copper were discovered in three of the samples, that in seven of the samples copper was present in small amount only, that eight samples contained it in considerable amount, that in six samples the metal was present in very considerable amount, that four of the samples contained this poisonous impregnation in very large quantities, it amounted almost to a poisonous impregnation; that the two samples of limes examined contained copper, the one in small amount only, the other in amount more considerable; that gooseberries, as commonly preserved, contain a considerable amount of copper, and some samples even a very large quantity; that rhubarb usually contains an amount of copper more considerable, some samples being contaminated with it to a very large extent. I may mention here a circumstance which I became acquainted with shortly after the publication of the report containing the conclusions I am now reading: a gentleman wrote to the "Lancet," giving his name and address, stating that he had partaken at dinner of some rhubarb tart; that he had noticed this tart presented a very peculiar appearance, that it was much more green than it should be, and he partook of it with suspicion, but still did eat some of it; and on accidentally casting his eye down and looking at his fork, which was of steel, he found the prongs to be covered with copper. That was a very striking fact, showing the impregnation of the rhubarb in this instance with copper.

Bottled Fruits and Vegetables.

40. Mr. *Villiers.*] Is that evidence published?—The letter of the gentleman referred to is published in my work on food.

41. Lord *C. Hamilton.*] Do you mean that there was a coating of copper left on the steel?—Yes; there was a bright coating of copper on the fork.

42. There is a great deal of oxalic acid in rhubarb, is not there, which would discolour a steel fork?—Yes; but that could not present the bright appearance which is given by the coating of copper.

43. What is the object of this species of adulteration?—It is to make the vegetables or fruits which are preserved in bottles, retain a green appearance.

44. It is solely for the purpose of colour, is it; it is not to enable the parties to sell the articles cheaper?—No; it is done entirely for the sake of colour, and it is altogether an unnecessary practice, because the colour which is produced by means of copper is by no means a desirable or natural colour; and so convinced of this are some manufacturers of these articles that they have ceased, since these exposures were made, to use copper at all; and the appearance and the flavour of the articles are, to my mind, very much improved by the omission. The effect of the addition of copper to bottled fruits is such as to be detected by the eye alone. A practised person can generally tell which has copper in it and which has not.

45. *Chairman.*] I believe you yourself have made the observation, that since these exposures took place, a very great difference is perceptible in the colour of different green preserved fruits which are placed for sale in the shop-windows?—A very remarkable difference indeed is obvious to the eye alone; but there is a great deal of that kind of adulteration practised still.

46. Mr. *Villiers.*] The fraud was unnecessary, you say?—I think wholly unnecessary, and some of the traders themselves begin to see that it is so.

47. When it was shown to be so, it ceased?—It has not ceased, but it is much less prevalent than it used to be.

48. Mr. *Sheridan.*] Are those frauds you now speak of entirely confined to England?—Not entirely. Another reason why copper is used is, not only to produce for the time a certain amount of greening of the fruits, but to make those

those fruits keep their colour for an indefinite period, so that they might be always saleable.

49. The French fruits are equally green: are they adulterated to the same extent?—I am not able to speak as to the French fruits. I do not think, however, that in France fruits are as commonly preserved in bottles as they are in England. Some of the crystallised fruits which come over from France contain copper.

50. Lord *C. Hamilton.*] Those adulterations you are now speaking of are performed entirely by wholesale manufacturers, are not they, and in that state sold to the trade?—In the case of pickles, and bottled fruits, and vegetables, the adulterations are entirely practised by the manufacturers or preparers of those articles.

51. Viscount *Ebrington.*] Do not you conceive that, in some cases, the addition of copper enables them to sell fruit or vegetables in the shape of pickles or preserves which would otherwise present, from their being of an inferior character, a distasteful appearance to the eye?—There is no doubt that that consideration operates to some extent.

52. It enables them to use up a deteriorated article in some cases?—It would do so no doubt; they would be able to do that to a larger extent than they otherwise could.

53. It is not therefore a wholly gratuitous and purposeless fraud?—No, there are one or two decided objects which they have in view in practising it. I think, however, the colour produced unnecessary and unnatural.

54. Mr. *Otway.*] They derive a gain from the fact that they are disposing of articles which they would not otherwise dispose of?—That is the case in many instances.

55. *Chairman.*] You have been asked with regard to foreign fruits; have you examined any olives?—I am presently going to speak of olives, and to state the result of the examination of some French and some Spanish olives. I should say that greengages in general contain a very great quantity of copper, the metal being frequently present in a highly dangerous amount. In olives this poisonous impregnation is in the largest amount, although its effect in heightening the colour of the fruit is less marked than in the other cases; I think, speaking from memory only, it appeared as the result of my examinations that the Spanish olives were found not to contain copper, while the French olives did so.

56. Lord *C. Hamilton.*] Is not that to be explained by the fact that Spanish olives are allowed to get riper, and have more oil in them, and are not intended to look green?—That will explain it no doubt. The conclusions resulting from the examinations of 28 samples of *anchovies* were, that seven of the samples consisted entirely of Dutch fish; that two of the samples consisted of a mixture of Dutch fish and anchovies; that the brine in 23 of the samples was charged with either bole Armenian or Venetian red, the quantity varying considerably in amount; but in most cases the brine was charged with these earthy powders to such an extent that they might be obtained and collected from the bottom of the bottles almost by teaspoonfuls. The results obtained from the examination of *potted meats* and *fish* were, that the samples of potted tongue and ham were entirely free from adulteration; that four out of the five samples of potted beef were artificially coloured by means of the red earth bole Armenian; that the whole of the samples of potted bloaters examined were highly coloured with the before-named earthy substance; that one of the samples of bloater paste was adulterated in addition with a large proportion of starch or flour, probably wheat flour, boiled; that the entire of the samples of anchovy paste analysed were still more highly and even vividly coloured with very large quantities of bole Armenian; that two of the anchovy pastes were, in addition, adulterated with flour, one with a large per-centage of wheat flour; that of the 28 samples of potted meats and fish subjected to analysis, no less than 23 were more or less impregnated with the red earthy material, bole Armenian.

ANCHOVIES.

POTTED MEATS AND FISH.

57. Viscount *Ebrington.*] Has bole Armenian any medicinal qualities, or is it calculated to have any effect upon the human frame?—I think it would in some cases have a medicinal effect. It contains iron, and iron, even when taken in very small quantities, is very stimulating; it would have a tonic effect, which in some cases might be desirable, but in other cases would be very undesirable indeed. I now come to *sauces.* From the examination of 33 samples of sauces, the conclusions were, that treacle and much salt formed the basis of the five

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samples of India soy examined, if they did not even entirely consist of these two ingredients; that in Lazenby's Harvey's fish sauce much oxalate of lime and numerous minute chips of charred deal were detected, the presence of these last affording some countenance to the inference that they had been used for the purpose of imparting colour to the sauce; that of the seven samples of tomato sauce analysed, six were artificially coloured, one, probably, with cochineal, and the rest by the addition of considerable quantities of the ferruginous pigment, bole Armenian; that the samples of essence of lobsters examined were almost saturated with very large quantities of bole Armenian; that the samples of essence of shrimps were saturated to an equal extent with bole Armenian; that the whole of the samples of essence of anchovies analysed were adulterated with immense quantities of the ferruginous oxide, bole Armenian; that three of the samples of essence of anchovy contained but a small quantity of muscular fibre of the fish; that two of the samples contained a proportion of flour, one being a sample of essence of shrimps and the other of essence of lobster; that out of the 18 red sauces submitted to examination, no less than 16 contained bole Armenian, and this usually in immense quantities, far exceeding what was detected in any of the potted meats and fish; that lead, for which separate analyses were made in each case, was not detected in a single instance; that traces only of copper were discovered in some three or four samples. The conclusions obtained from the examination of the different kinds of *preserves* and *jams* were, that the raspberry jam analysed contained a very considerable quantity of copper; that arises, no doubt, from the copper vessels in which those jams are prepared; they are boiled in copper vessels, and the acid of the fruit acts to some extent on the copper, and dissolves a certain amount of it.

Preserves and Jams.

58. There would be no advantage gained to the preparers of red jams from the introduction of copper, would there?—No; that is an accidental impregnation.

59. Mr. *Otway.*] That would apply as much to the jams made in one's own house as to those which one purchases?—Certainly. I mention it here as showing that it is desirable that copper should not be employed in the preparation of jams at all.

60. Mr. *Villiers.*] That is an instance in which fraud is not intended?—There is no fraud in that case at all. Four samples of gooseberry jam examined all contained copper. Copper, sometimes in large amount, was detected in 12 of the 14 samples of orange marmalade analysed. Here again the copper, no doubt, was not purposely added; it arose from the action of the marmalade upon the vessel in which it was boiled.

61. *Chairman.*] Is what is called orange marmalade always composed of oranges?—No. Three of the marmalades were adulterated with large quantities of a vegetable substance, most probably either turnip or apple. Nine samples of greengage jam were all more or less impregnated with copper, it being present in considerable amount in five of the samples. The greengages contained in three different boxes of crystallised fruits all owed their deep green colour to the presence of copper; the limes and greengages also owed their brilliant colour to a salt of copper. Copper was present in the three samples of candied citron peel subjected to analysis. Copper was detected in no less than 33 of the 35 samples of different preserves analysed; three contained traces only; in 11 the metal was present in small quantity, and in 19 either in considerable or even very large amount. The conclusions in the case of *lard* were, that lard is not unfrequently extensively adulterated, the ingredients employed being water and potato flour, as well as certain saline substances, as salt, potash alum, carbonate of potash and soda, and caustic lime, these being intended either to cause the lard to hold water or to improves it consistence and colour; that the description of lard most liable to adulteration is keg lard, and of this particularly that which is manufactured in England, Irish keg lard being but rarely adulterated; that of upward of 100 samples of lard submitted to examination, and procured chiefly from retail dealers, seven only were found to be adulterated. It appeared from the examination of the various samples of *butter*, that all the salt butters examined contained variable and usually very large quantities of water, the amount ranging, with one exception, from 8·48 to 28·60; that the fresh butters likewise contained variable and often considerable quantities of water, but in most cases very much less than in the salt butters, the quantities ranging from 4·18 to 15·43; that the quantity of salt contained in the salt butters varied from 1·53 to 8·24, showing that

Lard.

Butter.

that no fixed rule is acted upon in salting butter; that in the fresh butters the salt varied from 0·30 to 2·91; that the per-centages of butter contained in the samples ranged from 67·72 to 96·93, that is, some of the samples contained 20, 30, and in one case even nearly 35 per cent. of water and salt. The results obtained from the numerous analyses, chemical and microscopical, instituted of the various descriptions of *tobacco*, were to the following effect: Tobacco. that the tobacco-leaf itself presents certain peculiarities of structure by which it may be readily distinguished from the leaves of all other plants said to be employed in the adulteration of tobacco, especially in the form and structure of the hairs, and of the mid-ribs and veins. These peculiarities are so decisive as to enable the observer, by means of the microscope, at once to distinguish tobacco in all the forms of cut and roll tobacco, and even when the leaf is still more minutely divided, as in some kinds of snuffs. The majority of leaves not tobacco which have been detected from time to time in adulterated tobacco also present certain peculiarities in their organization, by which they may be all distinguished, not only from tobacco but from each other. While the structure of the tobacco leaf is constant, its composition varies very greatly, particularly as regards the quantity of gum and sugar which it contains, and the amount of ash furnished on incineration: thus we find that in the six samples of unmanufactured leaf tobacco, the amount of hygrometric moisture varied from 10·8 to 13·4 per cent., the extract from 40·8 to 60·0 per cent.; the sugar, from mere traces, to 3·6 per cent.; the gum from 7·4 to 10·1 per cent.; and the ash from 10·6 to 22·6 per cent. it being composed chiefly of chlorides, sulphates, carbonates, and phosphates, combined with much lime. In the eight samples of leaf stalk, the analyses of which are now given, the hygrometric moisture varied from 11·60 to 18·16 per cent.; the extract, from 21·04 to 39·85 per cent.; the sugar, from traces, to 4·91 per cent.; and the ash, from 20·00 to 28·24, these ashes being remarkable for the large amount of soluble salts which they contained. These differences are evidently so considerable and so varied, as to render it manifest that by imitating its chemical composition, tobacco may be adulterated to a considerable extent, without the possibility of our being able to declare with certainty that it is so adulterated. In the unmanufactured tobacco, including stalk, the hygrometric moisture varied from 11·25 to 22·96 per cent.; the extract, from 23·20 to 51·20; the soluble ash, from 3·00 to 11·44; the insoluble ash, from 9·60 to 17·80; the total ash from 13·60 to 27·90; the sugar, from traces to 4·91. In the manufactured tobaccos the hygrometric moisture varied from 9·80 to 65·76; the extract, from 29·32 to 62·20; the soluble ash, from 3·24 to 7·60; the insoluble ash from 9·20 to 16·24; the total ash, from 14·68 to 20·80; the sugar, from traces to 3·82. In the bird's eye tobaccos the soluble ash was very high, in consequence of the large quantity of mid-ribs which these tobaccos contain. The extract from the negroheads and twists was in some cases unusually high, as was also the quantity of glucose; these large extracts were, probably, in part due to the oil employed in the manufacture of these kinds of tobacco; but, principally, to the use of some saccharine solutions. Not one of the 40 samples of manufactured cut tobacco was adulterated with any foreign leaf, or with any insoluble or organic extraneous substance of any description, other than with sugar or some other saccharine matter, which there is good reason to believe was present in several instances. The more common adulterations of tobacco consist in the addition of water, sugar, and salts; the presence of these, in amount sufficient to constitute adulteration, can only be declared with certainty, however, when they are in considerable excess, or by a comparison of the unmanufactured and manufactured leaf. The conclusions arrived at from the examination of the 58 samples of *cigars* were, that cigars and cheroots are but little subject to adulteration; the Cigars. cheap penny cigars even consisting, in the majority of cases, entirely of tobacco; although, no doubt, of tobacco of very inferior quality. Cigars are, however, now and then met with, especially on race courses, at fairs, &c., made up of hay and brown paper. That notwithstanding the generally received opinions, opium was not detected in any of the 12 samples of Manilla cheroots analysed. From the examination of 43 samples of *snuff* of different kinds, the conclusions Snuff. were, that chloride of sodium or salt is added in large and very variable quantities to all descriptions of snuff, the proportion ranging from 1·0 to as much as 12·8 per cent. Where the amount of chloride is less than 1·0 per cent., it is probable that it is derived from the tobacco itself as well as the water used to moisten it: that the alkaline and earthy carbonates, chiefly the carbonates of

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potash and lime, are likewise added to snuff, sometimes in considerable quantity, but usually to a less extent than chloride of sodium. One of the samples yielded 3·9. It would appear, also, that in some cases the alkaline and earthy phosphates are in excess in snuff, as much as 7·0 per cent. of the former having been detected in one of the samples, and 4·8 per cent. of the latter in another: that the alkaline sulphates are likewise somewhat in excess, amounting in one sample to 5·4 per cent; in this case the addition may have been intentional: that oxide of iron derived from different descriptions of coloured ferruginous earths, as red ochre, yellow ochre, and some of the brown earths, as umber, was present in upwards of two-thirds of the samples, amounting in one case to no less than 5·0 per cent.; while all the Scotch snuffs contained iron, the oxide of that metal was not present in any of the samples of Welch and Irish snuffs submitted to analysis. The presence of the above-named ferruginous earths constitute so many adulterations, that chromate of lead was detected in nine of the samples, amounting in one instance to 4·6 per cent. It ocurred in five out of the nine samples of Scotch snuff examined; in one of the four samples of Welsh, and in one of the three samples of Irish snuff submitted to analysis. The presence of this metallic compound in snuff constitutes an adulteration.

62. Viscount *Ebrington.*] Chromate of lead would give to snuffs rather a pale colour, would not it?—It would give them rather a yellowish hue. Oxide of lead, probably in the form of red lead, was discovered in three cases, as much as three per cent. being found in one of the samples of Hardham's 37. The presence of this metallic oxide is also an adulteration and an infraction of the Tobacco Act. Bichromate of potash was present in three of the samples; in two cases it was found in the Scotch snuff, amounting in one sample to 6·2 per cent. The presence of this salt likewise constitutes an adulteration. Many of the samples contained a considerable quantity of silica, amounting in one instance to no less than 8·4 per cent. In some of the samples the addition was, no doubt, intentional. Genuine tobacco rarely contains more than 3·4 per cent, and usually much less. In most of the silicious residues of the ashes shiny particles were observed, which, under the microscope, presented all the appearances of powdered glass. Powdered orris-root was detected in two of the samples. The presence of this in snuff is likewise an adulteration. The total weight of ash furnished by the incineration of the greater number of the snuffs examined, although many of them were very moist, much exceeded that of genuine tobacco after being dried. While the ashes of samples of the latter have been found to vary in weight from 10·6 to 22·6, those of the snuffs which were not dried, and many of which contained large per-centages of water, were in no case under 18·26 per cent., while, in one instance, it amounted to 35·54 per cent. Had the snuffs been dried before analysis, as was the tobacco, the difference in the weight of the ashes would have been much more evident. The average proportion of water in the moist snuffs is about 25 per cent. Looking, then, at the whole of the above results, it is evident that snuff is subject to a very large amount of adulteration, and that of a kind which is not only detrimental to the revenue, but highly injurious to health.

63. *Chairman.*] Have you any report with regard to the Irish snuffs?—No special report.

64. Lord *C. Hamilton.*] Is not it the case that the snuffs which are most adulterated, are those which are kept moist?—The adulteration with water would apply, of course, to the moist snuffs; many moist snuffs are kept in cellars and in closed vessels, so that they cannot lose weight by the evaporation of the moisture; the addition of water to tobacco and to snuff constitutes a very important means of adulterating it.

65. Viscount *Goderich.*] Would not some of the articles you have mentioned, which are not poisonous in themselves, be very prejudicial if taken up through the nostrils to the brain?—No doubt of it. From the examination of upwards of one hundred samples of *coloured sugar confectionery*, the following important conclusions and particulars were arrived at. The principal colours employed are yellows, reds, including pink and scarlet, browns, purples, blues, and greens Of the yellows it appeared that seven were coloured with lemon chrome, or the pale variety of chromate of lead; that five were coloured with orange chrome, or the deep variety of chromate of lead; that forty-seven were coloured with the bright or canary-coloured variety of chromate of lead; that eleven of the samples were coloured with gamboge; while the colour of the majority of the above

Coloured Sugar Confectionery.

above samples was confined to the surface, in many cases it was diffused equally throughout the whole mass of the sugar used. Of the reds, sixty-one of the samples were coloured with organic pink colouring matters, consisting in most cases of coccus cacti or cochineal; in twelve of the samples the colouring matter was red lead, red oxide of lead, or minium; in six cases the colouring ingredient consisted of vermillion, cinnabar, or bisulphuret of mercury. Of the browns, it appeared that eight were coloured with brown ferruginous earths, either Vandyke brown, umber, or sienna. Of the purples, that two samples were coloured with a mixture of Antwerp blue, which consists principally of Prussian blue, and an organic red pigment, most probably cochineal. Of the blues, that one was coloured with indigo; that eleven were coloured with Prussian blue, or ferro-cyanide of iron; that eleven were coloured with Antwerp blue, which is a modification of Prussian blue; that in fifteen samples the colouring matter consisted of German or artificial ultramarine, which is a sulphuret of sodium and aluminum. Of the greens, that five samples were coloured with the pale variety of Brunswick green; that four were coloured with middle Brunswick green; that one was coloured with the deep variety of Brunswick green. These greens consist of a mixture in different proportions of the chromates of lead and Prussian blue; that one sample was coloured with verditer or carbonate of copper; that nine were coloured with Scheele's green, emerald green, or arsenite of copper. The above colours were variously combined in different cases; as many as three, four, five, six, or even seven colours occurring in the same parcel of confectionery, including three and even four poisons; that in four of the samples the colours used were painted on with white lead, or carbonate of lead. This was the case in all the cake ornaments. It further appeared from these analyses, that thirteen of the samples were adulterated with hydrated sulphate of lime, the quantity varying from 4·3 to 43·66 per cent. That twenty-one of the samples were adulterated with different kinds of flour, in quantities varying from 1·66 to 25·56 per cent. In seventeen samples the farina consisted of wheat flour; in three of potato flour, and in one of East India arrowroot.

66. *Chairman.*] Are not there many well-attested instances of serious illness, if not of death, arising from the consumption of articles of sugar confectionery which have been coloured with those poisonous materials?—Scarcely a year passes without very serious accidents happening arising from the employment of those pigments in sugar confectionery; there are instances of persons who have been killed outright by them, and many more instances of persons being taken seriously ill.

67. Mr. *Knight.*] I suppose the chief consumption of such confectionery is among children, is not it?—It is, to a great extent.

68. Is not the effect of these adulterations likely to be much greater upon a child than upon a grown person?—Certainly.

69. Lord *C. Hamilton.*] Do you happen to remember the instance of a public dinner in Essex, in which a person died in consequence of eating some of the confectionery which was thus adulterated?—I do; and the cases of several others are recorded in the reports which have appeared in the "Lancet."

70. Viscount *Ebrington.*] Generally speaking, I suppose you find that cases of adulteration are more frequent in the cheaper articles of confectionery?—The coarsest articles would be the most liable to adulteration; not the most liable to be adulterated with poisonous pigments, but the most likely to contain sulphate of lime, or large quantities of flour and starch, which are cheaper than sugar.

71. They are not more extensively adulterated, you think, than the dearer kinds with poisonous pigments?—No; the pigments are principally used to make them more attractive, so as to please the eye.

72. Viscount *Goderich.*] In the examinations you have made, have you always gone to the highest class of shops, such as those in Oxford-street and Regent-street, or have you gone to the lower districts, where the poor chiefly deal?—Some of the shops have been in Oxford-street and Regent-street, and many of them in the poorer districts. I have taken them from all classes of dealers.

73. Have you found any marked difference between the confectionery which you analyzed which was bought in the better class of shops, and that which you analyzed which was bought at the inferior shops?—I do not think I observed any particular difference; most of the samples of coloured sugar confectionery were purchased at what are called "sweet-stuff shops," some in Oxford-street, others in Tottenham-court Road, and in parts of the City.

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74. Did you go into the low class of shops, where poor people chiefly deal, and where they are more exposed to this system of adulteration than the better class of shops?—The report from which the conclusions just read are drawn contains the names and addresses of the different parties from whom the various purchases were made, and they were made in nearly all parts of London, one or two in Oxford-street, some in Tottenham-court Road, and others in Whitechapel.

75. Mr. *Otway.*] Does the adulteration of this coloured sugar confectionery apply to toffee and lollipops?—Very seldom to toffee and lollipops; they are made of brown sugar, and there is not much room for colouring there.

76. Viscount *Ebrington.*] Do you think there is any extensive consumption of this coloured confectionery?—An enormous consumption; and the consumption, if you judge from the number of these shops which exist now compared with the number which existed three or four years back, is certainly on the increase.

77. Mr. *Villiers.*] There is a great facility for fraud in these respects, is not there?—There is no check placed upon the use of any of the substances I have enumerated; the law does not provide a remedy against the use of any of them, no matter how poisonous they may be.

78. Mr. *Peacock.*] Would it be possible to colour those sweetmeats without using injurious substances?—It would be possible to colour them to a very great extent without having recourse to any injurious articles; there are many colours which are very simple and entirely innocuous.

79. *Chairman.*] Are you aware that the French Government found the use of poisonous colouring matter to be so extensive and dangerous that they have issued an Ordonnance forbidding the use of certain colouring matters, and pointing out to the manufacturers the precise colouring matters they may use, which are in themselves innocuous?—I have been long aware of the existence of the Ordonnance referred to; it has been in force, I think, since 1841 or 1842.

80. Showing, therefore, that colouring of a very brilliant kind may be imparted to sugar confectionery without its being in the slightest degree injurious to health?—Quite so.

81. Mr. *Swift.*] Have you analyzed any confectionery coming under the denomination of French confectionery?—I have not; I know, however, that confectionery in France is not coloured to the same injurious extent that it is in this country.

82. *Chairman.*] Is not it the case that the French confectionery is in itself always so tasteful and so various in design, exceeding very much English confectionery in that respect, that the importation of it is very large?—I think it is very probably the case that a large quantity is imported; at the same time it would be sold at a higher price; it would be found only in the more select shops.

83. Mr. *Swift.*] Did you go to any respectable confectioner's shop in Oxford-street or Regent-street?—Not a confectioner's shop; I speak chiefly of sweet stuff shops; those shops which sell nothing but this sweet confectionery; where they do not deal in ordinary confectionery, but simply in these sugar articles. I do not think there is a shop of that kind in Regent-street.

84. Viscount *Goderich.*] Have you analyzed any of the coloured confectionery which has been imported from Scotland?—I have not. Some of the articles analyzed were, I have no doubt, Scotch; but I do not know how to distinguish which are Scotch and which not.

85. Lord *C. Hamilton.*] The colouring materials you speak of are used merely to gratify the eye, are not they?—To gratify the eye principally, and to enable those manufacturers to prepare articles in the form of different fruits and vegetables, which are attractive.

86. They are rather intended to represent colour than to impart flavour?—Yes, they are to allow of the imitation of fruits and vegetables.

87. Mr. *Sheridan.*] The adulteration of sugar confectionery is not alone confined to colour, is it?—No; it is subject to be extensively adulterated by the addition of hydrated sulphate of lime, and with wheat flour and other kinds of starch.

88. Lord *C. Hamilton.*] Is not alum used for the purpose?—I am not sure.

89. *Chairman.*] Plaster of Paris?—Yes, as much as 43 per cent. in some samples I have met with.

90. So large a quantity of plaster of Paris must be very injurious to the system, must not it?—No doubt. *A. H. Hassall*, M.D.

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91. It is utterly innutritious?—Yes, and calculated to be injurious; it would be likely to interfere with digestion.

92. Mr. *Villiers.*] That is a cheaper article than sugar, is it not?—It is.

93. Therefore that is used for the purpose of pecuniary fraud?—No doubt, as in the case of the addition of various forms of starch and flour. I will now proceed to state the conclusions respecting the adulteration of *London stout* and *porter* obtained from the taps of the several London porter brewers and from publicans; that the samples of stout either obtained from agents or purchased at the taps of several of the principal London porter brewers were considerably stronger than those procured from publicans. The alcohol, of specific gravity ·796, temperature 60° Fahrenheit, contained in the former samples, ranged from 7·15 per cent, the highest, to 4·53, the lowest; whereas that of the stouts procured from publicans varied, with one exception, from 4·87 per cent. to 3·25 per cent. The same difference of strength also characterised the various samples of porter procured from the two different sources; the amount of alcohol in the porters obtained from the taps varying from 4·51 per cent. to 2·42 per cent.; whereas those purchased of publicans ranged from 3·97 per cent. to 1·81 per cent. In nearly all the stouts and porters salt was present, often in considerable amount. In some of the samples cane sugar and treacle were likewise present. There is reason to believe that the variation of strength would have been still more considerable had the samples been procured direct from the several breweries, instead of as in most cases from the brewers' taps. This diminution of strength in the beer purchased of publicans is only to be satisfactorily explained by the addition in many cases of water; this addition being no doubt sometimes practised by the publicans and other retailers of malt liquors. The addition of water constitutes the principal but not the only adulteration to which these beverages are subjected. Thus the addition of water reduces the strength, flavour, and colour to such an extent as to necessitate in some cases the further adulteration of the beer, and this is usually effected by means of a very coarse description of brown sugar containing much treacle, and known as foots, and salt. Since the use of cane sugar is permitted in the brewery, I did not attempt to ascertain which of the samples subjected to analysis contained that substance, because had I found it in any of the samples I should still have been unable to have declared whether the brewers or the publicans were the parties who made use of it. I believe, however, that the brewers do not often employ sugar, since it is alleged that beer made with any considerable proportion of cane sugar does not keep so well as that prepared from malt only. Moreover, the price of sugar forms an obstacle to its use in breweries. It appears from the analysis, that salt is almost constantly present in porter. This addition we know is made in the first instance by the brewers themselves; but there is also no doubt that a further quantity of it is frequently used by the publican to assist in bringing up the flavour of beer which has been reduced in strength by the addition of water. The quantity of salt contained in porter is often sufficiently large to communicate a perceptibly saline taste to the mouth. The salt is used by the brewers in the following manner: It is first mixed up in a tub with flour, usually wheat flour, and the mixture is cast by handfuls over the surface of the wort in the cooling vat. It is said to assist in the preservation and fining of the wort, and it is alleged that these are the only purposes for which it is employed by the brewer. The three usual and principal adulterations of porter consist, then, of water, by which its strength is reduced and its bulk increased; and sugar and salt, whereby its colour and flavour are in a measure restored. But there is good reason for believing, from evidence given before a recent Committee of the House of Commons on Public-houses, of which Mr. Villiers was the chairman, that other adulterations are practised, and that sulphuric acid, or oil of vitriol, salt of steel, or sulphate of iron, and cocculus indicus, are likewise not unfrequently used, and this both by the publican and the brewer. Not only is the fact of the addition of water proved by the present analyses, but evidence of another character has been supplied by different parties to the Committee above referred to, showing the same fact. In particular, it has been proved that a publican could not afford to sell porter at the price which he pays for it, in the state in which it is supplied to him by the brewers, and realise a profit upon it,

Stout and Porter.

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unless he had recourse to adulteration. I will now state the conclusions respecting the adulteration of *gin*, established from the analyses made of thirty-eight samples of that article; that the strength in alcohol, of specific gravity, ·7939 at a temperature of 60° Fahrenheit, of the various samples ranged from 15,645 grains to 34,160 grains per imperial gallon; the per-centages ranging from 22·35 to 48·80 per cent. It thus appears that some of the spirits contained only half as much alchohol as was present in some of the other samples, and therefore that their commercial value was reduced to the enormous extent of more than one half; thus supposing sample two to be worth 12 *s.* per gallon, sample 35 would be worth less than 6 *s.* per gallon. This variation in the strength of the spirits is doubtless principally attributable to dilution with water. The quantity of sugar ranged from 3 oz. 4 dr. 23 gr., to 13 oz. 4 dr. 13 gr. per gallon. Two of the samples contained oil of cinnamon, or probably of cassia. Seven of the samples contained Cayenne pepper, some of them in very large quantity, so that the syrupy extract left on evaporation possessed a burning and fiery taste. In no case was sulphuric acid detected; its absence being sufficiently shown by all the samples being neutral to test paper. Most of the samples contained combined sulphates, derived from the water and alum employed in their adulteration and clarification. In some few cases, possibly, the combined sulphates may be derived from white vitriol, white copperas, or sulphate of zinc, which I have the authority of a gin distiller for stating is commonly used, when gin has been diluted with water, for the purpose of causing it to "bead," as it is technically termed. Here again, then, we have evidence of a second adulteration calculated to prove injurious to health. It appears from the analysis of 19 samples of *rum*, that the strength of the samples varied from 25·61 per cent. of alcohol to 47·28 per cent.; that is, that some of the samples were nearly twice as strong as others, and consequently of nearly double the value. That six, or nearly one-third, of the specimens were adulterated with cayenne, the extracts left on the evaporation of the spirit being exceedingly fiery and pungent from the presence of that substance.

Gin.

Rum.

94. *Chairman.*] You have spoken of the adulteration of gin with white vitriol; does that frequently take place?—It is stated that gin is sometimes adulterated or rather fined with sulphate of zinc, but I have no knowledge of the practice of that adulteration, though I have reason to believe that it is practised.

95. Do you suppose, whatever may be the evil consequences of drinking gin, those consequences are materially augmented by the use of these mixtures?—There can scarcely be a doubt of it. I think no human stomach could stand the combined influence of alcohol and Cayenne pepper.

96. Lord *C. Hamilton.*] What is pure gin made of?—It should be alcohol flavoured with juniper berry; but I believe there is very little gin made in so simple a manner as that; all gin almost is flavoured with some special preparations called gin flavourings; I believe all distillers use these gin flavourings.

97. Mr. *Villiers.*] Are they very poisonous?—No; they are not, in general, poisonous at all; they are made from various aromatic and carminative substances, as orange peel, coriander, and a variety of things of that nature.

98. What is the advantage to the manufacturer or distiller from the use of them?—They enable him to please the palate of the consumer better, producing a flavoured gin which is better liked by the public.

99. They become more accustomed to the adulterated article than to the pure; so that they hardly know what the taste of pure gin is, do they?—They do not know at all what the taste of pure gin is.

100. Viscount *Ebrington.*] The juniper has decidedly medicinal effects, has it not?—It has.

101. It is not an uncommon thing for medical men to direct their patients to drink weak gin and water, instead of wine or beer?—It is very often done. Where they are anxious that the action of the kidneys should be well kept up, and the system supported, they are in the habit of prescribing small quantities of gin.

102. *Chairman.*] Are you aware that large quantities of gin and hollands are consumed in Holland?—Yes.

103. Does it come within your knowledge that the consumption of gin there does not appear to be attended with the same mischievous consequences which follow its consumption in this country?—I can hardly speak to that fact. The climate is colder; and where the climate is cold, a larger quantity of spirit of any

any kind can be taken with impunity. It does not seem to produce the same effects upon the system, and to excite the circulation to the same extent.

104. May not the inference be drawn that hollands is purer than English gin?—No doubt, hollands is a much purer form of spirit than the gin sold in this country.

105. Lord *C. Hamilton.*] Is juniper a very dear article?—It is not. I do not think gin flavourings are used to supersede the use of the juniper in any way, but the manufacturer conceives that, by the use of those gin flavourings, he produces an article which is better liked than if he were to use only juniper.

106. Is not it the fact, that many manufacturers obtain very strong spirit from raw grain, and then flavour it and sell it as gin?—I am told so.

107. Is not it a fact that in Holland they make it from malt?—Yes; there is a totally different mode of preparing it employed in Holland.

108. Mr. *Sheridan.*] Do gin manufacturers also manufacture the gin flavourings?—I am not aware whether they manufacture them or whether they are supplied to them. I fancy they manufacture them themselves. I suspect they are made by the maker of the gin, where he uses them, because each maker has a different form of flavouring which gives the gin a somewhat different character, and causes the gin of one manufacturer to be preferred to that of another.

109. Viscount *Ebrington.*] Generally speaking, the gin flavouring has not the same medicinal effect as the juniper berry, has it?—No.

110. Mr. *Swift.*] What are the gin flavourings composed of?—Of warming, and aromatic, and flavouring substances, to impart a pleasant smell to the gin, and a warmth to the stomach when they are taken.

111. Do all distillers use the same description of gin flavourings?—No, I think not; I should not say that every gin distiller has recourse to gin flavourings, but many have, and I think every gin distiller would give a preference to his own form of flavouring.

112. Mr. *Villiers.*] Gin is more used than any other description of spirit, is not it?—It is.

113. Hollands is quite a distinct spirit from gin, is not it?—It is.

114. *Chairman.*] What is the distinction between the two?—I cannot enter fully into the distinction, but it is a very essential one. Hollands, I think, is made from the raw grain, in a very careful manner, and there are not the same additions made to it in the way of flavourings; whereas here sometimes raw spirit is used, and the gin is made out of that raw spirit by dilution and the addition of flavouring substances. I will now proceed to *annato.* I may mention that annatto is a vegetable colouring substance; it is used largely in dyeing, and also in colouring cheese, and butter, and cream.

ANNATO.

115. Mr. *Villiers.*] Is it imported?—Yes, and it is a very expensive substance. From a review of the results of the microscopical and chemical examinations of 31 samples of annatto, it appears that chalk was present in 21 samples, wheat flour in four, rye flour in nine, turmeric in three, salt in 19, an oily substance (probably soap) in several, a red ferruginous earth (probably Venetian red) in 19, copper in three, whilst red lead was detected in five of the samples.

116. Viscount *Ebrington.*] Do you believe the adulteration of annatto to be chiefly made abroad or in this country?—I think the greater part of the adulterations practised with annatto take place in this country; indeed, I am satisfied that that is the case.

117. *Chairman.*] Have you turned your attention also to the subject of the adulteration of drugs?—I have; and I will proceed to state the analysis of four very important drugs. The first is *jalap.* From the examination of the analysis of 33 samples of powdered jalap, it appeared that of the 33 samples submitted to analysis, no less than 14 were adulterated, or nearly one-half; that this adulteration was in all the samples of the same kind, and consisted in the addition of large quantities of wood in a minutely divided state: that the wood employed in 12 of the samples was of the same kind; in the other two samples a different description of wood was used, as was evident from the characters of the fibres: that this adulteration amounted in some of the samples to at least one-third, the properties and strength of the jalap being, of course, impaired to that extent: that one of the samples yielded only 5·37 per cent. of extractive; and there is therefore much reason to believe that the resin had been previously extracted. From the analysis of *ipecacuanha,* it appeared that of the 33 samples of powdered ipecacuanha submitted to examination, 18 were adulterated, that is, more than one-half

JALAP.

IPECACUANHA.

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one-half of the entire: that of these one contained a very large quantity of tartar emetic. that two of the samples were adulterated with large quantities of carbonate of lime or chalk: that two were adulterated with wheat flour, one of these also containing a proportion of extraneous woody fibre: that one of the samples was adulterated with a vegetable substance containing much starch: that 12 samples were adulterated with various and often considerable proportions of extraneous woody fibre of more than one kind. On referring to the analyses of 23 samples of gum *opium*, as imported, it appeared that no less than 19 of the samples were adulterated, four only being genuine, the prevailing adulterations consisting of poppy capsule and wheat flour, many of the samples being adulterated to a very large extent; but in two cases sand, in one sugar, and in another gum, were discovered. From the examination of 34 samples of powdered opium, purchased of different chemists, wholesale and retail, it appeared that 31 of the samples were adulterated, and one only genuine, the principal adulterations, as in the previous case, being with poppy capsule and wheat flour; that four of the samples were further adulterated by the addition of powdered wood, introduced, no doubt, in the process of grinding. Out, therefore, of 55 samples of gum and powdered opium, the results of the microscopical and chemical analyses of which have been now recorded, five only were genuine. According to the analyses of the gum opiums, as imported, the amount of alkaloids, in which the active principles of opium reside, was found to vary from 2·7 to 14·0 per cent.; that is, in the proportion of nearly one to five. It is probable, however, that the Egyptian opium, which furnished only 2·7 per cent. of alkaloids, had been deprived of its morphia, and it was also adulterated with an enormous quantity of some gummy substance. The two gum opiums which furnished the next lowest amounts were, another sample of Egyptian opium, which contained only 3·7 per cent., and a sample of Turkey opium, which yielded but 4·2 per cent. of alkaloids. From an examination of the chemical analyses of the powdered opiums, it appears that the amount of alkaloids varied from 2·3 up to 12·2 per cent., or in the proportion of nearly one to six; that is, the samples differed in strength in that ratio. The lowest amounts of alkaloids furnished by the powdered opiums were 2·3 and 3·2 per cent.; these were, in all probability, exhausted opiums which had been previously employed in the preparation of tincture. I believe that it is not an unfrequent practice with druggists to employ the insoluble residue, when dried and pulverised, left from the preparation of the tincture of opium in the adulteration of powdered opium; I have also known it to be used for making the *unguentum gallæ compositum*.

Opium.

118. *Chairman.*] You would, probably, consider that there are few articles in the Materia Medica more generally used than opium, and the effects of which are more essential in very severe cases?—Opium is, undoubtedly, one of the most important medicines contained in the whole Materia Medica.

119. And any adulteration of it must be proportionally injurious, and sometimes even fatal?—Yes, no doubt of it.

120. It is generally used in cholera cases, is not it?—Yes; but especially in cases of *delirium tremens* opium is administered to the extent of many grains *per diem*; and it is essential, in such cases, that the opium should be good. If you were to employ opium largely adulterated, the consequence in many cases would be, that you would lose your patient.

121. Viscount *Ebrington.*] I suppose, if medical men were to make allowance for what may be called an average amount of adulteration, they would be liable to kill by administering over-doses if the dose happened to consist of genuine opium?—They would incur that risk, certainly; they know not how to calculate with certainty upon the effect of a given quantity of any remedy, where that remedy is subject to an uncertain amount of adulteration.

122. Lord *C. Hamilton.*] Is it easy to detect the adulterations of opium?—It is in many cases. The majority of the adulterations of opium can be detected readily enough.

123. Can they be easily remedied?—I am afraid not.

124. Mr. *Villiers.*] There are some places, are there not, where you may always obtain genuine drugs, such as Apothecaries' Hall?—All adulterations of drugs may be divided into two classes; the adulterations which are practised on those drugs before they reach this country, and the adulteration which the drugs experience after their arrival here. In all cases you cannot insure obtaining a genuine drug from any seller of drugs in this country, because he cannot

cannot answer for what may have been done with the drugs before they reach his hands.

125. Do not they retail drugs at Apothecaries' Hall, and are not they sure to be genuine?—In the great majority of cases they are.

126. Do not they submit them to some test?—If they did not do so, there would be no certainty that in buying opium or scammony you would obtain it genuine.

127. Mr. *Peacock*.] Have you examined any samples obtained from Apothecaries' Hall?—Yes, and I never met with any adulterated article from Apothecaries' Hall, but I have not examined more than three or four samples coming from Apothecaries' Hall. Still I should think, as that is a recognised and regularly constituted body, you would be tolerably secure of getting genuine drugs from them whenever it was possible to procure them.

128. Is opium subject to adulteration before it arrives in England?—Yes, and there are analyses conducted on a large scale in India by the East India Company before they sell the opium; they have inspectors to examine the opium as it is brought to the factory; it is brought to the factory by the different growers and sold to the Government.

129. Is it adulterated before it comes to the Government?—Yes, it is adulterated by the grower before it is brought to the factory.

130. Viscount *Goderich*.] What is the proportion of adulteration before importation and after importation?—It is difficult to lay down any rule as to the proportion; but you would find adulteration to be much more extensive if you were to take a certain number of samples of pounded opium purchased from ordinary retail shops, and to compare them with the same number of samples as imported, and the same with respect to other drugs.

131. Viscount *Ebrington*.] One set of adulterations is put upon the top of another, is not it?—In the case of drugs, there are in fact three sets of adulterations. One of those is the adulteration to which foreign drugs are exposed abroad; then there are the adulterations to which drugs are subjected at the hands of the drug-grinder; a great many of our drugs pass from the wholesale chemist to the drug-grinder, whose business it is to reduce them to powder. There also the retailer of those drugs may adulterate, and do his part in the process of adulteration. A very large proportion of the adulterations practised with drugs, I have no hesitation in saying, is due to the drug-grinder.

132. Mr. *Villiers*.] How does it answer his purpose to do so?—The way in which it is done is this. A person having a drug which he wishes ground, forwards a given weight of it to the drug-grinder. The drug is generally returned to him of the same weight, or nearly so, and sometimes it is even ordered to be returned weighing so much more. Now, in the process of grinding, part of the moisture which all vegetable substances contain escapes. There is a great loss of moisture in the process of grinding, as well as other loss, and that loss is made up by adulteration; and not only is it made up, so that the original article is returned of its full previous weight, but sometimes even over that weight, according as may be desired by the person sending the drug to be ground.

133. How does the grinder manage that; does not the wholesale chemist know that the drug must lose weight by the loss of moisture?—Yes; but he is not prepared to meet the whole of that loss.

134. Then the grinder does it for the benefit of the manufacturer?—He adds to the weight for his own benefit as well.

135. Do you mean that he abstracts some portion of that which is sent to him to grind?—That is frequently done, no doubt. I would not bring that as a charge against the whole body of drug-grinders, but it has been done. The practice, however, which I now describe, of sending a drug of a certain weight to be reduced to powder, requiring that it should be returned without sufficient allowance for loss, is common.

136. Mr. *Otway*.] Is the drug-grinder also a drug-seller?—No; he charges a certain sum upon the operation of grinding. He may increase his profits, if he chooses to be dishonest enough, by abstracting a portion of the article entrusted to him.

137. What becomes of those abstractions?—There are various ways of getting rid of them. I can mention a circumstance which came within my own knowledge. A member of a very respectable firm in this city sent to me a sample of flake cocoa for examination; I examined it, and found it to contain a large

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quantity of wheat flour. He was very much surprised, and said, "I buy the best cocoa beans in the market; I forward them to the grinder, and if there is any adulteration, he must be the person who has practised it, not I."

138. Mr. *Swift.*] Are there any wholesale dealers in drugs who grind their own drugs?—There are some few who do so, but drug-grinding is a business of itself, to a great extent; powerful machinery is required and special adaptations.

139. That would be a means of preventing adulteration?—It would of course be one means.

140. Mr. *Sheridan.*] The fact is well known in the trade; it is that a portion of the drug is abstracted before it is returned to the wholesale chemist?—More frequently there is no abstraction; but there is the addition of an inferior substance to make up the weight.

141. Mr. *Otway.*] Referring to the case of opium, do you speak from any special knowledge when you say that the adulteration takes place by the grower?—There are a great many cases of adulteration recorded on the part of growers. The inducement to adulterate opium is very great on account of its price.

142. Are you of opinion that no adulteration takes place in the factory?—Not in the factories of the East India Company.

143. Have you any knowledge on that point?—I have read a long account of the system pursued in one of the principal opium factories in India, and I am acquainted also with a gentleman who is superintendent of the factory I refer to.

144. You are aware that the East India Company manufactures salt also, are not you?—Yes.

145. And that a very large adulteration is alleged to take place in the salt factories of the East India Company?—I cannot say whether there is any foundation for that or not.

146. Mr. *Kinnaird.*] Do you say that the opium factory is the property of the East India Company?—Yes, so I believe; the last drug I will mention is

SCAMMONY.

scammony. The conclusions deducible from the examination of 30 specimens of this drug were these: that out of the 13 samples of scammony as imported, submitted to examination, one only was genuine, it yielding 79·60 per cent. of resin, the active principle; that 11 of the samples were more or less adulterated, the amount of adulteration varying between 8 and 75 per cent., and the proportion of resin between 46·20 and 72·00, one sample having only 13·20 per cent.; that one sample was entirely factitious, being composed of the resins of guaiacum and jalap, with much woody fibre, cellular tissue, and other insoluble matter; that the adulterating ingredients detected consisted for the most part of impure carbonate of lime or chalk, and wheat flour, and sometimes sand, or other earthy substance, and gum, and considerable quantities of woody fibre and cellular tissue; that of the 17 samples of powdered scammony purchased of various chemists and druggists, analysed, one only was genuine, it affording 76·40 per cent. of resin; that the whole of the remaining samples were adulterated, frequently to an enormous extent; the adulterating ingredients constituting from 18 to about 65 per cent. of the entire article, and the resin varying from 27·20 to 65·60 per cent., that is to say, some of the samples contained little more than one-fourth the proper quantity of scammony, and of course were deficient to that extent of the active properties which they should possess; that the adulterating ingredients in these samples consisted principally of large quantities of wheat flour, with frequently some chalk, and occasionly sand, or other earthy substance.

147. *Chairman.*] What is scammony?—It is a very important article of the Materia Medica. It is a drastic purgative.

148. Is it used by itself?—Sometimes by itself, sometimes in combination with other purgatives, such as colocynth or aloes. I have now described to the Committee, in as condensed a form as the subject will admit, the nature of the principal evidence I have to offer, by which the fact of adulteration, and the prevalence of the practice is proved. I propose next to consider the subject of adulteration as a question of public health.

149. Mr. *Swift.*] Are English drugs adulterated?—Nearly all drugs are subject to adulteration which it will pay to adulterate. The majority of drugs are foreign. There are very few drugs which are grown at home. Still there is no reason, in consequence of their being grown at home, why they should not be adulterated, provided there be sufficient temptation to do so. It is always a question, I am afraid, of mere profit.

150. *Chairman.*]

150. *Chairman.*] Is it your opinion that the adulterations of the various articles to which you have referred have a very important influence upon the public health?—No doubt, I think, can possibly be entertained on that subject. No one who examines with sufficient care the facts can doubt that the subject of adulteration is one of high importance in a sanitary point of view, and as a question of the public health. In the first place, the adulteration of articles with substances although harmless in themselves, is prejudicial, by reducing and weakening the properties of those articles. This is the case when roasted corn or carrot, &c., is added to coffee, water to milk, &c.; but the remark applies especially to medicines, for in this case to reduce the strength of a medicine by adulteration is to destroy or modify the proper action of that medicine. The proper doses of different medicines have been determined in most cases by careful observation and experiment, and in different doses the same medicine is known to produce very different effects. To adulterate medicines even with harmless substances is therefore to destroy the very foundation of the healing art, and to render nugatory the wisest and best directed efforts of the physician. In the second place, adulteration acts prejudicially to the public health, when substances are employed possessing injurious properties. Now, a great variety of such substances are used for the purpose of adulteration. I have myself detected, amongst others, the following: the three chromates of lead, the three Brunswick greens, which are mixtures of the chromates of lead and indigo, red oxide of lead, or red lead, arsenite of copper, sulphate of copper, carbonate of copper, or verditer, carbonate of lead, or white lead, bisulphuret of mercury, or vermillion, acetate of copper, sulphate of iron, gamboge, Cayenne in spirits, bronze powders, which are mixtures of copper and zinc, sulphate of lime, &c., and other articles more or less injurious. This list, it will be observed, contains the names of some of the most virulent poisons. Sometimes the quantity of these substances used is so considerable, that immediate ill effects are produced. Thus, not a year passes but that many serious accidents arise out of the practice of colouring sugar confectionery with poisonous pigments; more frequently the effects are more slowly developed. The substances, although taken in but minute quantities, gradually accumulate in the system, until at length serious consequences are produced. In proof of this I may mention that several cases of paralysis have recently been traced to the use of snuff adulterated with lead. One of these cases rests upon the authority of Professor Erichson. He followed that case out minutely, and has furnished a very careful record of the symptoms which characterised it. The result of the discovery of the cause of illness was, that though the patient was an old man, he to a great extent recovered the use of his limbs again. The table I now hold in my hand contains the names of the several injurious substances actually detected by myself, and of the articles in which they were found: arsenite of copper, emerald green, or Scheele's green, has been discovered in coloured confectionery; blue vitriol, or sulphate of copper, acetate of copper, commonly called verdigris, in pickles, in bottled fruits and vegetables, in preserves, and in dried and crystallized fruits and in sugar confectionery; carbonate of copper or verditer, in sugar confectionery, &c., and in tea; the three chromates of lead, pale, canary, and orange chromes, in custard powders, in snuff, in sugar confectionery, and in tea; red oxide of lead in Cayenne, in curry powder, in annatto, and in milk, cheese, and butter. Red ferruginous earths, as Venetian red, in the red sauces, as shrimp, lobster, anchovy, and tomato sauces, bole Armenian, red and yellow ochres, umber, &c. in potted meats and fish, including frequently saveloys, in cocoa and in chicory, in anchovies, in annatto, in cheese, in tea, and in snuff. Carbonate of lead in sugar confectionery; plumbago or black lead in certain of the black teas; bisulphuret of mercury or cinnabar in Cayenne; and in sugar confectionery; sulphate of iron in re-dried tea and in beer; sulphate of copper in bread occasionally; coculus indicus in beer; Cayenne in gin, rum, ginger, and British wines; gamboge in sugar confectionery. The chromates of potash in tea and in snuff; the three false Brunswick greens, being mixtures of the chromates of lead and indigo, in sugar confectionery. The oxychlorides of copper, or true Brunswick greens, in sugar confectionery; orpiment or sulphuret of arsenicum, in sugar confectionery; ferrocyanide of iron, or Prussian blue, in sugar confectionary; indigo in sugar confectionery; ultramarine in sugar confectionery; artificial ultramarine in sugar confectionery; hydrated sulphate of lime, mineral white, or plaster of Paris, in flour and bread, and in sugar confectionery; alum in bread. Sulphuric

Effects of adulteration on health.

Table of injurious substances employed for adulteration.

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Table of injurious substances used in sugar confectionery.

acid in vinegar; bronze powders in ornamental confectionery. I have here another table in which those injurious substances only are enumerated which have been detected in a single article, sugar confectionery, and the use of which should be prohibited: gamboge; the three chrome yellows, or chromate of lead; yellow orpiment, or sulphuret of arsenicum; king's yellow, or sulphuret of arsenicum, with lime and sulphur; iodide of lead; red lead; minium, or red oxide of lead; vermillion, or bisulphuret of mercury; red orpiment, or bisulphuret of arsenic; iodide of mercury; Vandyke brown and umber; all purples resulting from the mixture of any of the prohibited reds or blues; Prussian blue, or ferrocyanide of iron; Antwerp blue; a preparation of Prussian blue; cobalt; smalt, or gloss of cobalt; verditer, or carbonate of copper; natural ultramarine; a double silicate of alumina and soda, with sulphuret of sodium. German, or artificial ultramarine, which resembles in its composition natural ultramarine. The three false Brunswick greens, mineral green, or carbonate of copper; verdigris, or diacetate of copper; emerald green, or arsenite of copper; the true Brunswick greens are oxychlorides of copper; gold, silver, and copper bronze powders, which consist of alloys in different proportions of copper and zinc; white lead, or carbonate of lead. Now, with evidence such as the above, I think it is impossible to contend that the use of such a variety of injurious and even poisonous substances is unattended with danger, and that adulteration does not affect the public health. It may so happen, and it doubtless does sometimes occur, that the same person, in the course of a single day, receives into his stomach some eight or ten of the articles which I have enumerated. Thus, with the potted meats and fish, anchovies, red sauces, or Cayenne, taken at breakfast, he would consume more or less bole Armenian, Venetian red, red lead, or even bisulphuret of mercury, or cinnabar. At dinner, with his curry or Cayenne, he would run the chances of a second dose of lead or mercury; with the pickles, bottled fruits, or vegetables, he would be nearly sure to have copper administered to him; while, if he partook of *bon-bons* at dessert, there is no telling what number of poisonous pigments he might consume. Again, at his tea, if mixed or green, he would certainly not escape without the administration of at least a little Prussian blue, and it might be much worse things. Lastly, if he was a snuff-taker, he would be pretty sure to be putting up his nostrils, from time to time, small quantities of either some ferruginous earths, chromate of potash, chromate of lead, or red lead. If an invalid, his condition would be still worse; for then, in all probability, he would be deprived of much of the benefit of the skill of his physician, through the dilution and sophistication to which the remedies administered for his relief were subjected. This, I would remark, is no fanciful or exaggerated picture, but one based upon the legitimate conclusions derived from the analysis of different articles as sold to the consumer.

151. *Chairman.*] If he were a very convivial man, he might finish the day with a glass of gin and water, and take in it a considerable quantity of white vitriol?—Yes, and Cayenne.

152. Mr. *Villiers.*] And nux vomica is put into his porter, is not it?—That has been done no doubt; but I should hope it is a very rare adulteration, and it is one upon which I have no evidence to offer myself, but there is authority for the statement that it has been had recourse to.

153. Mr. *Peacock.*] And cocculus indicus?—That, there can be no doubt, is used.

154. It gives it a head, does not it?—It gives it an intoxicating property. I may say that the chief adulterations of malt liquor which I have found, and which are usually practised, consist in the addition of water and treacle and sugar. I have great reason to believe that the state of things I have described does not exist to nearly the same extent in France, and some other continental states, nor with respect to drugs in America; and this mainly owing to the vigilance of the authorities. But upon this point I hope to have hereafter some positive evidence to lay before the Committee.

155. *Chairman.*] You are still pursuing the investigation as to the adulteration of drugs in foreign countries, are not you?—I propose to do so at a very early period.

156. Mr. *Sheridan.*] You spoke of the adulteration of vinegar; is a very weak solution of sulphuric acid very deleterious?—It is a very harsh and strong acid; its effects are certainly medicinal. I think the administration of sulphuric

acid

acid should rather be prescribed as a medicine, than be employed in an article of food.

157. What is white vinegar?—It should be distilled vinegar.

158. Is it less liable to adulteration than common vinegar?—I should think not. It may equally contain sulphuric acid with the coloured vinegar; it may have somewhat less, because it brings a higher price; and that may be one reason why it should not be so much adulterated.

159. Mr. *Knight.*] Is not white vinegar made from pyroligneous acid?—It ought not to be so; it should be distilled, but I am afraid it is not always so.

160. Viscount *Ebrington.*] Sulphuric acid is very extensively used in prescriptions, is not it?—It has of late years been very extensively used in checking diarrhœa, therefore vinegar containing it might have some effect in checking the due action of the bowels if taken daily.

161. Mr. *Villiers.*] Have you any evidence to offer as to the character of the water which is supplied by the water companies in London?—The evidence upon that head is very voluminous. I have been recently engaged, with the sanction of the Treasury, in making certain inquiries, which are now about to be submitted to the Houses of Parliament, in regard to the condition of the water supply of the Metropolis during the attack of the cholera in 1854.

162. It is owing to its being so bad just now that they have instituted the inquiry?—I understand they are about to institute a fresh inquiry. My inquiries date from the attack of the cholera in 1854, which inquiries have been continued up to within the last few months.

163. Will the result of these shortly be before the House?—In a very few days.

164. Mr. *Swift.*] Does the adulteration of vinegar take place by the distiller?—In some cases by the vinegar manufacturer, and in others by the retailer.

Importance of the microscope in detecting adulteration.

165. *Chairman.*] Have you any remarks to make upon the means which are afforded by the microscope for the detection of the adulterations of which you have been speaking?—I have. I wish to make a few observations as to the powers and capabilities of the microscope as a means of detecting adulteration. Vegetable substances possess an intimate organization or structure visible only by the aid of the microscope, different in the case of most of such substances. These differences of organization are so great and decisive, that by them most of these substances may be distinguished one from the other, and this when they are pulverised, and even scorched and roasted. All that is required for this purpose is a knowledge of the structures by which the different substances are characterised. Thus, the structure of coffee is very different from that of chicory, of wheat flour from that of oats, and so on. It was by means of the microscope that I succeeded the other day in detecting in a sample of a vegetable powder termed pheasant powder, used to feed pheasants, sent to me for examination by Dr. Rawson, of Lichfield, no less than 11 distinct vegetable substances, as linseed, aniseed, Cayenne, black and white mustard, wheat flour, the seed of a cytissus, and at least four other substances. Now this could never have been effected by chemistry; the most accomplished chemist would hardly have succeeded in detecting more than one of these substances, and hence the great value of the microscope as a means of discovering adulteration. Until recently, the power of the microscope in this particular application was nearly unknown. So recently as 1850, the then Chancellor of the Exchequer was enabled to quote in the House of Commons the opinions of three of the most distinguished chemists of the day, who had been employed by the Government specially to report upon the subject, "that neither by chemistry nor by any other means was the admixture of chicory with coffee to be detected." At the very time this statement was made, I had shown that the detection of this and other similar admixtures was most easy and certain. Until the microscope was brought to bear upon the subject, however, no means existed whereby the great majority of adulterations could be discovered, and the parties practising them little dreamt that an instrument existed capable of bringing to light even these secret and guilty proceedings. Adulteration was then practised in security, and with comparative immunity; now this feeling of security has been destroyed, and the adulterator knows that at any time he is liable to discovery. Up to the period of the general application of the microscope to the discovery of adulteration, the officers of the Excise were driven, for the most part, to seek for evidence of adulteration by forcible entry, and the seizure of articles upon the suspected

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premises. The objections to this method of proceeding are obvious; now in most cases the fact of adulteration can be proved without forcible entry, by the simple purchase of the suspected article, and subsequent application, to its analysis, of the more extended resources of science which exist in the present day.

166. Mr. *Villiers.*] How long is it that you have used the microscope to detect adulterations?—Almost continuously for a period of nearly five years.

167. Have the Excise resorted to the use of it lately?—I have no doubt the Excise do make use of it now more than they did formerly; it is possible they may have used the microscope occasionally for some years.

168. Do you know whether they have used it to detect the presence of chicory in coffee?—I cannot speak to that from my own knowledge, but I should think it possible that they do so now.

169. I believe that subject has particularly occupied their attention, namely, the adulterations of coffee with chicory?—It has occupied their attention a good deal lately.

170. You appear to have no doubt that the Excise officer could detect that adulteration with the microscope whenever he chose?—Nothing is more simple and easy.

171. Viscount *Ebrington.*] Is not it the fact that great discouragement was shown to any impediment being placed in the way of that kind of adulteration by the Government some time ago?—The Government at first were not quite so willing to move in this matter, as I hope now that the facts are made known more extensively they will be.

172. Mr. *Otway.*] What is the date of that statement of the Chancellor of the Exchequer, which you alluded to in your former answer?—In 1850.

173. Mr. *Villiers.*] Chicory is grown very much in this country, is not it?—It is.

174. It was spoken of as a boon to the agricultural interest to encourage chicory being mixed with coffee?—It was considered so, but it was a very poor boon indeed.

175. *Chairman.*] Do you consider the use of chicory injurious?—I have my own opinion upon that question; but without entering upon the question as to whether it is wholesome or unwholesome, I think there can be no doubt of the impropriety of permitting the sale of an article as coffee which does not consist of coffee, but which consists only partly of coffee.

176. Lord *C. Hamilton.*] Is not it the case that whatever property, good or bad, chicory has, by charring it it loses that quality?—Its active properties, no doubt, are very much impaired by the roasting process to which the chicory is subjected, though they are not perhaps wholly destroyed; the principal matters contained in roasted chicory are gum and colouring matter, and there is no active principle in it which can be compared to that of tea and coffee.

177 Mr. *Villiers.*] You have stated that chicory itself is adulterated?—Yes.

178. Mr. *Otway.*] You do not know whether the microscope has been used to detect the adulteration of coffee with chicory, do you?—I only presume it; I think there can be no doubt of the fact. Many houses have lately been proceeded against for the adulteration of coffee with chicory. No attempt of the kind was made previously to my investigations, which is sufficient in itself to show that the microscope has recently been employed by the Excise for the purpose.

179. Mr. *Kinnaird.*] Is there much difference between the value of chicory and coffee?—Considerable difference; speaking generally, I should say that chicory is not more than one-third of the value of coffee.

180. *Chairman.*] Do you believe that adulteration is now going on very extensively; under the present law, parties are obliged to sell coffee as coffee, and chicory as chicory, or if they sell a mixture they are obliged to put on the outside that it is so sold?—The adulteration of coffee is not so prevalent as it was formerly, by any means.

181. You think the public are to a certain extent still injured by persons who sell coffee and chicory combined?—Yes, no doubt

182. *Chairman.*] Have you any suggestions to offer with respect to the remedies which could be adopted for the purpose of preventing the practice of adulteration?—The remedies which I am about to describe are simply those which occur to myself from the knowledge I have acquired of the subject of adulteration.

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Suggestions to remedy adulteration.

adulteration. The Committee may see reason to differ from these suggestions very materially when they have before them a large amount of information, and many facts and views which have not suggested themselves to me. The means which I think should be employed for the suppression of adulteration are of two kinds. The first include those measures which are required for the detection of adulteration, and the second those for its prevention. For the *detection* of adulteration it is requisite, first, that there should be a central Board or Commission, composed of scientific analysts, microscopical and chemical; under the direction of this Board, purchases of articles should be made from time to time, analyses of them instituted, and periodical reports published. Secondly, that examining inspectors should be appointed, whose duty it should be to keep a close watch upon all suspected articles, to make purchases of samples, and to forward them to the central Board for the purpose of being analysed and reported upon. These inspectors should be appointed at all the more considerable export and import towns, to prohibit either the importation or exportation of adulterated articles of all kinds, including especially drugs. They should likewise be appointed and have their residence in all the large inland towns, certain districts being assigned to them in connexion with those towns. Thirdly, that a cheap treatise on adulteration should be published, emanating from the central Board. This should be illustrated with wood-cuts, showing the microscopical appearances and structure of the different articles, both genuine and adulterated, and containing plain directions for the discovery of adulteration. Such a treatise, if carefully prepared, would prove of the greatest value in checking adulteration. There are now some hundreds, probably thousands, of microscopical observers, scattered throughout the country; many of these, if furnished with the means which a work of the kind indicated would supply, would gladly apply themselves to the detection of adulteration; and thus the more frequent exposure of adulteration would be ensured. Lastly, for the more effectual discovery of adulteration, the public might be invited to forward to the central Board, under seal and with the names and addresses of the parties of whom the samples were procured, articles in their possession, suspected to be adulterated. For the *prevention* of adulteration, the following are the measures which appear requisite. That a system of publication of the names and addresses of all persons whose goods have been analysed should be adopted, and this whether the articles on examination proved to be genuine or adulterated. That the seller of adulterated articles should be punished by the infliction of fines; that the actual adulterator should be punishable by fine or imprisonment, or both. I would wish to observe, that I am disposed to rely for the suppression of adulteration much more upon the free publication of the names and addresses of the parties whose goods have been subjected to analyzation than upon the infliction of fines or imprisonment; nevertheless, I believe that both these means of punishment are requisite. At the present time, the adulteration of all articles upon which an Excise duty is levied is punished, when discovered, by heavy pecuniary penalties; but the Excise does not take notice of adulteration in non-exciseable commodities, and which adulteration, therefore, at present for the most part escapes punishment altogether. The punishment by imprisonment should be reserved for aggravated cases, and for the actual perpetrator of adulteration. This punishment I conceive to be necessary, in order that the offence of adulteration may be stigmatized by the law, as it deserves. This punishment is one which has long been in existence in France, where it is not unfrequently inflicted. For the suppression of adulteration in certain articles, as beer, spirits, milk, and coloured sugar confectionery, special regulations might be had recourse to. The value of beer and spirits may be estimated by the quantity of alcohol which they contain. The more these are adulterated by dilution, which is the ordinary adulteration practised, the less alcohol they will be found to contain. It might therefore be rendered imperative that the different kinds of beer and ale, and of spirits in use, should not be sold under certain fixed or standard strengths in alcohol. This regulation is proposed for the protection of the Excise, and not as a question of health. I may mention that it is one which is already in force in the case of the sale of spirits by the distiller. The value of milk, with certain precautions, may be estimated by its weight; and all milk sold under a certain weight might be declared to be adulterated, as is done in France and some other continental states. Lastly, in the case of coloured sugar confectionery, a list of all the injurious or poisonous pigments employed should be made out, and their use prohibited, as has been

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done in France for many years past. The above is a short outline of the measures which appear to me to be necessary for the discovery and prevention of adulteration. No objection, I believe, exists to the scheme thus briefly set forth on the score of expense; *on the contrary, while a considerable saving of expense would ensue to the consumer, the revenue would be greatly benefited and the public health protected. The requisite machinery is already in existence.* At the present time there is an extensive and very costly machinery at work for the prevention of the adulteration of all exciseable articles, that of the Excise, consisting of analysts and inspectors. The Excise, however, has failed to accomplish, to a great extent, this object; further, it takes no cognizance of any adulterations which do not immediately affect the revenue, no matter how detrimental these may be to the public health; thus it does not interfere in the case of the adulteration of drugs, nor does it interdict the use of poisonous pigments in the colouring of sugar confectionery, &c. Nearly all, therefore, that appears to me to be requisite in order to ensure, to a very great extent, the suppression of adulteration, is, *to remodel the detective and analytical departments of the Excise, and to enlarge the sphere of their operations.* The analytical department should be made to take cognizance of all adulterations, whether in duty-paying articles or in articles free of duty. The best way, perhaps, would be to institute a separate Board, to which the analytical department of the Excise could be transferred, and to place the various Customs and Excise detective inspectors in communication with this Board.

183. Mr. *Villiers.*] Do you consider that the system of adulteration of which you have spoken is very injurious to the revenue?—Unquestionably; there are on exact data upon which the precise amount of injury to the revenue can be calculated, but sufficient data exist for one to be able to state with strict accuracy that the loss to the revenue arising from adulteration must amount annually to some hundreds of thousands of pounds. A witness who gave evidence some time since before the Committee of the House of Commons on Public-houses gave it as his opinion that the loss to the revenue arising out of the adulteration in a single article, namely, beer, was not less than 100,000 *l.* The gentleman who gave that evidence was Mr. M'Culloch, who was for many years, if he be not now, connected with the Excise, and who is thoroughly conversant with the subject on which he was speaking.

184. He referred to the loss on the malt; much more malt would be consumed if less water were put into the beer?—Yes, he estimated a loss to the revenue upon the diminished consumption of malt, arising out of the dilution of the beer.

185. Viscount *Ebrington.*] I suppose you take into account also the loss of revenue from the so-called coffee, which has never passed the Customs; and so in the case of what is sold for tea and sugar, which has never passed the Customs?—Yes.

186. *Chairman.*] Is it your opinion that the practice of adulteration has been diminished by the exposures which have taken place of various instances of adulteration which have been practised?—There can be no doubt but that adulteration is greatly diminished, in consequence of the exposures made by the sanitary commission of the "Lancet." This diminution is shown in two ways: first, if a given number of samples of any article be subjected to microscopical examination, a smaller proportion of them will be found to be adulterated now than formerly. In the second place, the improvement, in many instances, is so great, as to be visible to the eye alone; this improvement is particularly manifest in the case of pickles, bottled fruits and vegetables, and coloured sugar confectionery. Formerly it was scarcely possible to procure samples of pickles or preserved fruits which were not artificially coloured, and obviously so to the eye alone, with copper; now a large proportion is entirely uncoloured. Again, as many as eight or ten poisonous substances might be seen in almost every sweet-stuff shop entering into the colouring of the sugar confectionery; at the present time these poisonous mineral pigments are much less commonly used, although they still are so to a large extent.

187. You speak of the Excise as having failed to suppress adulteration, even in duty-paying articles; is adulteration very prevalent in those articles?—I find adulteration to be very prevalent in duty-paying articles of consumption; for example, it is very prevalent in pepper, spices, arrowroot, tobacco, especially snuff,

snuff, beer, and spirits. In failing to suppress adulteration in those articles, the Excise has failed in one of the great objects of its institution.

188. To what do you attribute that failure?—I attribute the failure of the Excise to suppress adulteration in exciseable articles to several causes; to the conduct of the Excise with regard to coffee, in so long permitting the admixture of chicory and other things with coffee. For a long time chicory was allowed to be sold with coffee, and as coffee, without any interference on the part of the Excise. I attribute it also to the small number of exposures of adulteration made by the Excise, and to their not having sufficiently availed themselves of all the resources of modern science for the detection of adulteration, and especially of the microscope.

189. Then you think that by the microscope, and more efficient arrangements, a large proportion of the adulterations in exciseable commodities might be prevented?—Yes, undoubtedly.

190. What is your opinion as to the propriety of legalising the sale of mixed articles or mixtures, as is done now in the case of coffee and chicory?—I should be most unwilling to legalise such admixtures of articles, unless a very strong case could be made out, showing their necessity. The objections to these mixtures are, that they appear to give a legal sanction to adulteration; that the mixtures are often sold for the genuine articles. I know, from personal experience, that to be so at the present time with regard to coffee and chicory; people go into different shops and ask, perhaps, for two ounces of coffee; it is a very common thing for them to have placed in their hands a mixture of coffee and chicory, and then, if they complain of it, the right article is placed in their hands, and the first is passed off as a mistake, or it was supposed they would prefer to have it, it being so much better. These mixtures are also objectionable, because the quantities of the several ingredients entering into the mixtures are subject to the greatest variation; thus, of the mixtures of chicory and coffee sold, many consist almost entirely of chicory; and also, because the price charged for these mixtures is often as much as for the genuine article, the consumer being a great loser. Certainly, if in any case these mixtures are permitted, it should be required that the ingredients of which they are composed, and the proportions in which they are mixed, should be clearly specified.

191. Mr. *Villiers*.] Have you brought any of these subjects under the attention of the Board of Health yourself?—I have not. In preparing my work on food, I was led to dedicate the preface to the President of the General Board of Health, in the hope that he would himself take some steps in the matter, and would be induced to lend the weight of his position and authority to get the practice of adulteration suppressed, as far as possible.

192. What is the view taken by the Board of Health of their jurisdiction in these matters?—Sir Benjamin Hall, in a letter he addressed to the Medical Council, and which he read to them at a meeting at which I was present, expressed his opinion of the importance of the question of adulteration of food, drink, and drugs, but hitherto he has not done anything in the matter. I know his time has been very much occupied in reference to the Bills he has had, and still has, before the House of Commons.

193. You refer to the Health of Towns Bill?—Yes; that is one which he has withdrawn; and then there is the Metropolis Local Management Bill and the Nuisances Removal Bill.

194. Has the Board taken any notice of the state of the water supplied to the town?—They have noticed the condition of the water from time to time, when any special complaint has been brought under their notice. I do not think they have instituted any inquiry as to the present condition of the water supply of the Metropolis; I think if they had done so I should have heard of it.

195. Viscount *Ebrington*.] Are you aware that the Society of Arts has lately offered prizes for the cheapest description of microscope, and has succeeded in obtaining microscopes at very moderate prices?—I have heard that they succeeded in getting them very cheaply indeed, as low as from 3*l*. 10*s*. to 10*l*.

196. And there is every reasonable prospect of a large number of them being purchased and distributed throughout the country?—That would have a very beneficial effect in aiding in the suppression of adulteration.

197. Mr. *Sheridan*.] Is there any substance in the way of adulteration which is sold for the coffee berry?—I believe some years since it was common to fabricate something in the shape of the coffee berry, which used to pass as the coffee

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berry; and I have heard it stated that chicory has been used for that purpose; I have not myself detected it, but this is very common, where persons ask to have their coffee ground for them while they wait for it; there is a vessel of some kind full of chips of chicory of about the size of coffee berries placed close to the mill; the grinder throws in dexterously some of these fragments of chicory together with the coffee, and so reduces the whole to powder, and you fancy you have got the genuine article when you have not.

198. Mr. *Gregson.*] Are you aware of the present instructions given by the Board of Inland Revenue as to the sale of coffee and chicory?—I am; I believe they are to the effect that the inspectors employed to purchase samples of coffee should in all cases inquire for "pure coffee," and not for coffee only.

199. Are you of opinion that such a regulation is conducive to the sale of pure coffee when coffee is asked for?—No, I think it has the contrary tendency.

200. Are you of opinion that the public are in favour of having mixtures instead of pure commodities?—I certainly consider that they are not in favour of mixtures.

Obs.—Throughout this evidence I have used the words "duty paying" and "exciseable" articles of consumption as synonymous, whereas I find that there is a very important distinction between the two. The number of exciseable articles of consumption is but very small, whereas that of duty-paying articles is more considerable. The Excise only takes cognizance of adulteration occurring in the former and not in the latter; thus it does not attempt to prevent adulteration in arrowroot, spices, &c. It thus appears that the sphere of operation of the Excise is much more limited than I had originally apprehended.

Mercurii, 18° *die Julii*, 1855.

MEMBERS PRESENT.

Mr. Scholefield.	Viscount Goderich.
Mr. Otway.	Lord Claud Hamilton.
Mr. Kinnaird.	Mr. Sheridan.
Mr. Peacocke.	Mr. Wise.
Mr. Villiers.	Mr. Knight.
Mr. Gregson.	Mr. Swift.

WILLIAM SCHOLEFIELD, Esq., IN THE CHAIR.

Arthur Hill Hassall, M. D., called in; and further Examined.

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201. *Chairman.*] I BELIEVE you are desirous of laying before the Committee some additional evidence; will you have the goodness to proceed to do so?—I have brought with me a few specimens of bottled fruits and vegetables preserved without copper; I have also brought a few corresponding specimens which have been greened with that mineral poison. The Committee will at once perceive by the eye alone the very great difference which exists between the two; those without copper are of a pale yellowish green and perfectly natural colour, while those with copper are of a deep blue and most unnatural colour. Here (*producing the same*) is a bottle of greengages in a natural state, and also a bottle of the same fruit coloured with copper. The difference in the case of pickles is perhaps more striking still. When the fruit and vegetables are cooked the difference becomes still more obvious and striking; while the natural fruit or vegetable undergoes but little change of colour, that with the copper becomes often of a startling blue tint. The specimens free from copper were put up by Messrs. Crosse & Blackwell, one of the largest and oldest establishments of the kind in London. The practice of artificially colouring all green pickles, fruits, vegetables and preserves with copper prevailed almost universally until the publication of the reports in the "Lancet," in which this practice was exposed, and Messrs. Crosse & Blackwell have acknowledged in a most candid and honourable manner that they themselves adopted the practice

to

to some extent until that time. Since the publication of the articles referred to, however, they have entirely ceased to use copper, being convinced that the practice was bad and unnecessary. For this change on their part great credit is due to them, because in many instances by so doing they ran counter to the wishes and tastes of their customers. Messrs. Crosse & Blackwell state, however, that although the change occasioned inconvenience at first, they have now begun to reap the benefit of it in increased custom. Messrs. Crosse & Blackwell have likewise abandoned to some extent the use of bole Armenian in the colouring of the red sauces, potted meats, and fish, &c., and propose ultimately to do so entirely. I have here (*producing the same*) two bottles of anchovy sauce, one prepared in the usual manner with a proportion of bole Armenian, and the other without that colouring matter; the proportion of the bole Armenian employed in the colouring of that sauce is 10 pounds of the earth to 100 gallons of the sauce.

202. Mr. *Kinnaird.*] Is the colouring unwholesome?—In some cases I should think the colouring ingredient would have a prejudicial effect; it contains iron, and that might, with some persons, act prejudicially; at all events the addition of that substance is nothing more nor less than the addition of so much dirt.

203. Viscount *Goderich.*] Why do they colour it in that way?—It renders the article, as they suppose, more attractive to the eye; it pleases many, but I think the taste is a false one.

204. Mr. *Sheridan.*] Is there an essential difference in flavour and taste?—The taste is certainly in favour of the uncoloured sauce.

205. Mr. *Otway.*] The anchovy which is sold is always of a red colour, is not it?—I believe it is always so; the practice is one which prevails throughout the trade.

206. Mr. *Kinnaird.*] And has prevailed for a great number of years?—As long as I can remember, at least.

207. Mr. *Sheridan.*] Is the French anchovy sauce of the same solour as this?—I am not acquainted with the colour of French anchovy sauce; the French tomato sauce does not generally contain this colouring matter, whilst English tomato sauce does.

208. The natural colouring of tomato sauce would be red, would not it?—Yes; but the colour being vegetable, it would be apt to fade on exposure to the light; and to remedy that English makers put in this red earth.

209. Mr. *Otway.*] Where did you get this uncoloured anchovy sauce?—It is some that Messrs. Crosse & Blackwell have just had made, to see what article they could produce without using any colouring matter, and they now propose to sell that only.

210. You found them anxious in every way to favour the inquiry, did you?—Yes.

211. Lord *C. Hamilton.*] The real anchovy generally comes from the Mediterranean, does not it?—Yes.

212. Is not it always sent from there with some colouring matter, which has given rise in this country to the idea that it must be red?—That I am not aware of; I only know the state of the article as it is consumed in this country. I do not think it is imported in that red condition we see it in the shops here. In the case of anchovy paste which is always sold coloured, that adulteration takes place undoubtedly in this.

213. Mr. *Knight.*] Have you had any communication with the other tradespeople who are mentioned in your book?—If any complaint has arisen, they have communicated with the "Lancet," and, in some cases with myself, where necessary.

214. Messrs. Crosse & Blackwell having expressed their wish to do away with this process of adulteration, has any one else communicated to you the same intention?—No one that I remember.

215. *Chairman.*] Has not the expression of their intention been in consequence of your being in communication with them?—I heard they had discontinued the practice of colouring their bottled fruits and vegetables with copper, through Monsieur Soyer, in the first instance. I have also brought with me a few specimens of coloured sugar confectionery, in order that the Committee may see how coarsely and grossly they are coloured. They have not been analysed, because to do so would be to destroy them to a great extent; it would lead to the removal of the colour. I can judge sufficiently, however,

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by the eye alone, to be able to state that chromate of lead, red lead, Prussian blue, Brunswick green, which is a mixture of Prussian blue and chromate of lead, arsenite of copper, gamboge and cochineal are amongst the number of the pigments with which the articles are coloured.

216. Mr. *Kinnaird.*] Is there sufficient in one of those cakes to affect a child deleteriously?—It might produce temporary derangement, but if that child were to be in the habit of daily eating two or three of those cakes, it might injure it very seriously.

217. Do you suppose that articles of that kind are extensively eaten by children?—They are, but not so much so as they were a year or two ago. Since the publication of the reports in the "Lancet," a great difference is to be observed in the colours which are exhibited in the shop windows.

218. Mr. *Otway.*] Were not those bought at a very low class of shops?—Some of them were bought at a shop which children principally frequent; some of them at leading shops; and some were purchased at Bainbridge's, a confectioner in the Westminster-road.

219. Mr. *Swift.*] He is a very celebrated man, is not he, in his way?—I am not aware. On Friday last I read a list of colours of an injurious character, which have been ascertained to be used in the colouring of sugar confectionery, the use of which articles I considered ought to be prohibited; I have here a list of colours, the use of which may be permitted in the colouring of articles of sugar confectionery; *yellows*, saffron, turmeric, French berries, Persian berries, quercitron bark, fustic woods, and lakes of the four last named colours. *Reds*, cochineal, lake of ditto, including carmine, Brazil wood, madder, and lakes of the last two colours. *Purples*, madder purple, logwood and indigo; any of the lakes with indigo or litmus; *blues*, litmus and indigo; *greens*, sap-green, which is the juice of rhamnus catharticus, yellow lake or French berries and indigo; mixtures of any of the vegetable yellows or lakes with indigo, including Persian berries and indigo; care should be taken to ascertain that the sap-green and litmus are pure; the first is certainly liable to injurious adulteration with copper, and litmus is stated to be sometimes adulterated with common arsenic and peroxide of mercury.

220. *Chairman.*] Are those colouring matters you have now mentioned expensive?—The majority of them are very cheap indeed.

221. Are they more expensive, do you think, than the colouring matters which have been generally used?—In general they are not. I made some observations also in my previous examination, for the purpose of showing the importance of the microscope as a means of detecting adulteration. I was led to do so, because even now the value of that instrument is, in certain quarters, not fully appreciated. I showed that the neglect of employing that instrument had, in 1850, enabled the then Chancellor of the Exchequer to quote the opinions of three of the most distinguished chemists of the day, to the effect "that neither by chemistry, nor by any other means, was the admixture of chicory with coffee to be detected." The fact at the same time being, that the discrimination by means of the micoscope was most easy and certain. I would wish now to refer to another instance, in which the neglect to employ competent microscopical observation led to the commission of a serious mistake. In 1851, Sir George Grey issued a Commission to inquire into the State of the Water Supply of the Metropolis, the Commissioners being Professors Graham, Miller, and Hoffman, chemists of distinguished ability, but not microscopists. I have at home the Report of these gentlemen, and I find at page 8 the following statement, having reference to the water of the Thames as supplied by the Metropolitan Water Companies: "In these waters, when submitted to microscopic examination, no animalcules were observed in any case; but the period of the year was not that at which any considerable development of animal life is to be looked for." Upon that I would remark, that for many years past I have examined, at all seasons, the water of the Thames Water Companies, and in no case have I ever met with a single sample of that water in which living organic productions were not to be discovered when sought for in the proper manner. I, therefore, have no hesitation in declaring that this statement is wholly erroneous, and that the Government were seriously misled by it in a most important matter. The only way of accounting for the mistake is, that the Commissioners not being microscopical observers, were not competent to make this particular examination properly. The two statements emanating from chemists, were, however, the less excusable, because they were

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both made in contradiction to other contrary statements, resting on the authority of competent and reliable microscopists. I have been led to make these observations, because I am desirous that the great value of the microscope in analysis should be generally known and appreciated, which, until recently, it has not been, even by some scientific men. In the evidence given on Friday, I also made some remarks upon the practice pursued by many drug-grinders, of adding different kinds of sawdust to drugs, under pretence of cleaning out the mill, but really in order to make up for loss of weight resulting from drying and powdering, and for adulteration. In 1848, Mr. Redwood, professor of chemistry to the Pharmaceutical Society, published in the "Pharmaceutical Journal," an article on drug grinding, from which I will quote the following extract, page 228, in corroboration of the remarks then made: "Sawdust, then, is as indispensable at a drug-mill as water is necessary in a druggist's shop, and if the druggist sends damp jalap containing 15 per cent. of water to be ground, and requires dry powder to be returned with only 4 per cent. of reduction for loss, he adopts a conventional method of asking for some of the rinsing of the mill, veritable powder of post." Again, in the evidence of Dr. R. D. Thomson, given before a Select Committee of the House of Commons, to inquire into the "Administration of Relief to the Poor," it is stated in answer to a question by Mr. Wakley, "that it is common to send to the drug-grinders 84 pounds of jalap to be made into a hundred weight." One of the questions put to me by Mr. Villiers at the last meeting of the Committee was, whether I knew the opinion entertained by the President of the General Board of Health in reference to adulteration. I stated in reply to the effect, that although the President had not hitherto taken any active steps in the matter, yet in a letter dated 6th September 1854, addressed to the Medical Council, he had recognized the importance of the subject of adulteration. In that letter, Sir Benjamin Hall thus expresses himself on the subject: "The circumstances of this country, its wealth and poverty, its great cities, with their social extremes of luxury and privation, its aggregation of individuals in the same spots, its multifarious industrial occupations, all point to the duty of studying the effects on life and health of trades, callings and processes, habitations, sites, water supply, sewerage; the adulteration of substances used for food, drink and medicine, as matters vitally affecting the well-being of the nation." The reason why the Board of Health has not yet actively taken up the subject of adulteration, is to be explained by the fact, that its time has been engrossed with a variety of important matters; thus at the outbreak of cholera in the autumn of 1854, the President, with the concurrence of the Medical Council, caused a very extensive series of inquiries and investigations, chemical, microscopical and meteorological, to be made into the causes of the epidemic. These inquiries are now completed, and the various reports almost ready for presentation to the Houses of Parliament. Further, the attention of Sir Benjamin Hall has been hitherto much engrossed with the Nuisances Removal Bill, Metropolis Local Management Bill, and Health of Towns Bill. I have been given to understand, however, that as soon as a medical member has been attached to the Board of Health, the subject of adulteration will be inquired into, with the aid probably of the Medical Council. Another question was put to me, relative to the subject of water supply, as to whether any Commission had been issued to inquire into its state at present. I have made some inquiries on the subject. I find that no Commission has been issued to enquire into the state of the Thames and of the waters of the companies which take their supply from the river. The present condition of the river is described as being due to the emptying of a canal filled with sewage matter, I believe near Brentford, to the increased impurity of the river, and to the heat of the weather promoting decomposition. It is most probable, however, that a commission will ere very long be issued. In a letter dated January 1855, addressed to Lord Palmerston, Sir Benjamin Hall thus refers to the subject of the water supply of the Metropolis: "Of all questions that can come under the consideration of the Metropolitan authorities, none exceeds in importance that of water supply; that the present supply of the Metropolis is defective both in quality and mode of distribution is hardly contested. The Water Supply (Metropolis) Act of 1852 will no doubt lead to great improvements; I would submit on this point, that when the period arrives at which the Act requires that the works for the improved supply are to be completed, an inquiry should be instituted embracing two points; first, how far the companies

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have complied with the Act, and secondly, how far the improvements rendered compulsory by the Act have given to London a supply satisfactory both as to quantity, quality, cost and distribution." A question was likewise put to me by a member of the Committee as to whether any machinery existed in the Nuisances Removal and Diseases Prevention Act, which might be made available for the suppression of adulteration. I have consulted the Act, but I do not find in it the requisite machinery. It suggested itself to me, however, in the perusal of the Act, that the various local Boards of Health scattered throughout the country might, if placed in communication with any central Board in London which might be established for the purpose of suppressing adulteration, render very important service. At page 14 is a clause imposing a penalty not exceeding 10 *l.* on the sale of meat, fish, poultry, fruit and vegetables in an unwholesome state and unfit for the food of man. In the framing of this clause, I have been given to understand there was some question as to the propriety of including in it all articles of food so adulterated as to be injurious to health; but it was ultimately considered that the subject of adulteration was of a distinct character, and ought to be dealt with separately.

222. Viscount *Goderich.*] Do you not think that the inspector of nuisances, who is mentioned in the 26th clause of the Nuisances Removal Act, might be usefully employed for the purpose of detecting adulteration?—In some cases he might perform useful service in bringing under the notice of any authority that might be constituted the existence of adulteration in certain articles: at the same time, there is no doubt that the great majority of the adulterations practised are of such a kind as would altogether escape his detection. In the case of the obvious colouring of bottled fruit and vegetables with copper, and again in articles of sugar confectionery, he might render good service by forwarding samples to the central Board, under proper regulations, so that some reference to the subject of injurious adulteration in that paragraph of the Act would tend to good.

223. Mr. *Villiers.*] I understood you to say the other day, that it was very easy to ascertain if those articles were adulterated?—In some cases it is easy; in the majority of cases it is easy to one who is properly qualified to make the investigation, but it is not easy without the aid of good microscopical and chemical science.

224. Can there be any nuisance greater than that of adulterated food?—No.

225. Is there anything more injurious to health?—No.

226. You think it only requires a properly qualified inspector to detect it?—Properly qualified inspectors could do a great deal in checking adulteration, but not an ordinary inspector of nuisances, perhaps.

227. Could he ascertain what it is which has made the water almost poisonous which is just now supplied by the water companies in London?—The causes of that could be traced out very readily by proper inquiry, I should say.

228. He could, at any rate, suggest that to the Board of Health, could not he?—Yes.

229. Do you know what the contract of a water company is with its customers?—I suppose it is that the water supplied should be of a pure and wholesome character; the new Act states that expressly.

230. Is there any Board whatever, or is there any authority which has jurisdiction over the London companies by any recent Act?—The Act to which I have referred of 1852 gives a jurisdiction over the present companies, but it is not yet in force; it is about to come into operation in the course of a very short time.

231. What is the time that the cholera has generally appeared in this country?—About August or September.

232. Then, if it comes into operation on the 31st of July, it is just possible it may be in time?—The first enactment does not come into operation till the 31st of August; that is, the provision with regard to the source of supply of water from the Thames at Thames Ditton.

233. What authority can interfere with those companies if they do not provide a healthy supply of water under this Act?—The Act is not in force to any extent at present; whether any previous Act touches the water companies, I do not know.

234. What authority will they be subject to on the 31st of August?—To the Board of Trade; a complaint signed by 20 ratepayers supplied with the water

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of any one company submitted to the Board of Trade, will cause an investigation to be made into the condition of the water.

235. If they find it as bad as it is at this moment, are there any penalties proposed to be imposed upon the companies?—The Board of Trade can cause an inquiry to be instituted, and it can render to a certain extent imperative its decision in the matter, whether by fine or by compelling them to discontinue the source of supply for the time being I do not know.

236. I understand you to say that you have made some inquiry about this water, and that you have analysed it?—In conjunction with Dr. Thomson of St. Thomas's Hospital I have made some very extensive inquiries into the water of the Thames and the water supplied by the different metropolitan water companies; that inquiry was set on foot owing to the outbreak of the cholera last year, and it had reference more particularly to that subject; at the same time analyses of the water of the different companies are stated at very great length, and there are very many conclusions to be drawn from the examinations, of general interest, not bearing upon cholera at all, but upon the question whether the present water supply is pure or not.

237. I take for granted you have reported, if you have reported at all, upon the bad state of the water?—Yes, I have.

238. Are you able to say from your experience that that is irremediable?—There is no remedy which can be at once and immediately found for the present condition of the water, short of leaving off the source of supply altogether.

239. There is no other remedy, is there?—There is no other immediate remedy.

240. I believe it is the fact that the filter which the Chelsea Company use is not sufficient, and the water is still bad and unhealthy?—It certainly is very bad water after filtration; it is much improved by filtration, but still it remains exceedingly bad.

241. The only remedy you can suggest would be deriving the water from another source?—Yes.

242. That I believe has been attempted; some projects have been brought forward for the purpose of obtaining water from the neighbouring counties?—Yes.

243. What prevents their having been done?—I believe the difficulties which have been encountered either on the part of the Government, or of the House of Commons, in bringing legislation to bear on the subject.

244. What have been the difficulties?—The difficulties in getting an Act empowering a company other than those which are now in existence to supply water to any part of the Metropolis; in fact, the monopoly which exists.

245. The difficulty of getting a Bill to provide the Metropolis with good water arises from the opposition of interested parties?—Yes.

246. Do those interests consist partly of interests in the neighbourhood of the source from which the water would be derived, and partly of the water companies who have now the exclusive supply?—I should think the principal opposition to the bringing in that water comes from the water companies.

247. Are you aware that great mischief has been apprehended in the neighbouring counties to those from which the water would be drawn?—I can hardly give an opinion as to whether there is a proper foundation for that fear or not; I have heard very strong opinions to the contrary.

248. I understand you the present state of things is not irremediable, but any improvement is resisted by the water companies who have now a monopoly in London?—Any improvement which involves the having recourse to a different source of supply is strenuously opposed by the present water companies.

249. What do you expect must be the effect of this water upon the community; do you expect that it would either aggravate an epidemic, should one occur, or even produce one?—I think the facts elicited in regard to the late outbreak of cholera are sufficiently strong to warrant the conclusion that a bad state of water does materially aggravate the epidemic, if it does not give rise to it. The opinion of some is, that the water is essentially connected with the origin and propagation of cholera.

250. Have you heard that the cholera has produced the worst effects wherever the water is bad?—There are many cases cited in proof of that.

251. Not only here, but in other parts of the world?—Yes, and in other parts of England.

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252. Mr. *Knight.*] Have you analysed any water from the Thames recently?—Microscopically, I have.

253. You do not know of any chemical process by which it can be rendered more wholesome?—Many of the waters at present supplied could be rendered more wholesome if they were subjected to efficient filtration, and if they were stored, as they should be, in covered reservoirs, and not in open receptacles exposed to the air and the light. All the water hereafter supplied by the companies will have to be supplied filtered, and within a certain distance from St. Paul's to be stored in covered reservoirs.

254. What did you find to be the condition of the water when you applied the microscope to it?—I found the water of the Thames and the water of all the companies supplying from the Thames, and that of other companies also, to contain living animal and vegetable productions in great numbers.

255. Lord *C. Hamilton.*] Is it not the case that the real difficulty of getting a fresh supply of water in London is, that owing to the Act which will come into operation next August having been passed three years ago, Parliament feels that, as it imposed upon the water companies a very great outlay, it is somewhat unfair to interfere with them till they have carried into effect their new plan, and brought in their new supply?—I am afraid that will be the argument which will be used for some time to come in opposition to any proposal of improvement.

256. It is rather that feeling which has prevailed on the part of Parliament, is not it, than any private interest?—I think both have an influence.

257. Mr. *Knight.*] Do you think that which you have found in the water is putrid animal and vegetable matter, or is it animalcules, which are so numerous?—There is both living organic matter in the water of the Thames and dead organic matter, the living deriving their nourishment from the dead organic matter; without the one there could scarcely be the other.

258. Lord *C. Hamilton.*] Are you acquainted with the steps which have been taken to improve the water supplied to the Metropolis?—To some extent I am.

259. Do not you apprehend that there will be a great gain to the public in consequence?—There will be some gain to the public, but I do not believe that the water, under the provisions of that Act, will be in a satisfactory state.

260. No supply is then to be drawn from any part of the Thames subject to tidal action?—No, it is to be taken from above Thames Ditton; at the same time, the water supplied from Thames Ditton by the different companies will not be free from all the objections which are raised against the present supply. The water from Thames Ditton will still contain a great variety of living organic productions, and some of them even after the methods of filtration which have been hitherto adopted have been resorted to.

261. Mr. *Peacocke.*] Have you found the water this year, when you subjected it to examination by the microscope, worse than in previous years?—I cannot say that I have drawn any distinction in that respect. I have found it at all times to be very bad.

262. Lord *C. Hamilton.*] Do the same remarks apply to water drawn from the River Lee?—Yes; the water supplied from the River Lee and by the New River Company abounds with organic productions; hitherto the New River Company have not supplied filtered water, but they will have to do so shortly.

263. Mr. *Villiers.*] Do you mean that they supply the water as it is, with those organic productions in it?—They supply water merely purified, as the phrase goes, by subsidence; that is, the water is allowed to rest in large reservoirs, and any heavy matter it contains to fall down as sediment.

264. In what part of the town is the supply from the New River; is it general all over the town?—The district supplied by the New River Company is a very extensive district; it is one of the largest and most influential of the water companies.

265. Are the companies in competition with each other?—There is scarcely any competition whatever; they agree amongst themselves for the most part in any course which they may take.

266. What was the nature of the Bill which was proposed; did not it contain some attempt to control them all?—There is some controlling power over the companies in the Act which is shortly to come into operation; it may be a question whether the power of control is sufficient.

267. Mr. *Otway.*] Is not it established that the cholera has been more or less prevalent according to the locality from which the water supply has been derived, as

as it has been from a higher or lower part of the Thames?—I am hardly prepared to say that that is conclusively proved; I think it was to a great extent proved that the mortality was much greater in the same district, supplied in part by the Southwark Company, and in part by the Lambeth Company.

268. I have seen some tables which show, that according as certain districts have received water from a lower part of the Thames, the mortality has been greater, and as the supply has been derived from a higher part, the mortality has been less?—That is the conclusion many persons have come to from an examination of the mortality occurring in districts supplied by those two companies. The Southwark Company takes it supply from near Chelsea, and the Lambeth Company from Thames Ditton.

269. Mr. *Swift*.] Water companies have been very profitable investments, have not they?—They have been generally understood to be so.

270. Do you know anything like the comparative value of the shares now and when the companies were first established?—The value of the shares of the New River Company, compared to their value in the early history of the company, I know has greatly increased.

271. Does that apply to the other companies?—Not to the same extent, but to some extent it does.

272. A 100*l*. share in the New River Company is worth 12,000*l*. or 13,000*l*., is not it?—I know the increase is enormous.

273. Did not the Bill which was passed in the year 1852 give an advantage to the companies, by providing for an advance in the price of water?—I believe that that is so, but I would not be understood as saying positively that I know it to be the fact.

274. Mr. *Kinnaird*.] Have you read the evidence given before the Select Committee on the Water Supply which resulted in the Act of 1852?—I have read some of the evidence; I gave evidence myself before that Committee.

275. Are you aware of any efficient plan having been proposed to that Committee in substitution for the present supply from the water companies?—I think the proposal made by the Watford Company was one which, as far as I am able to judge, should have been entertained.

276. Was that so called because it drew water from the neighbourhood of Watford?—Yes, from a deep well sunk in that locality, and there was also a proposal about which there has been a great deal of discussion for getting the surface drainage water from the neighbourhood of Bagshot.

277. Viscount *Goderich*.] In your evidence on the last day you stated that, as a second remedy for the prevention of adulteration, you would propose that examining inspectors should be appointed; do you think that the inspectors to be appointed under the Nuisances Removal Bill would be available for that purpose; I will draw your attention to the fact, that in large towns those inspectors are likely to be persons capable of discharging the duties which I imagine you to propose the inspectors should discharge, and in small places, though they might not be so well able to carry on minute examinations into adulteration, they would be able at least to detect many very patent adulterations?—Their services might be rendered available to some extent, but the ordinary duty of an inspector of nuisances is of a very onerous kind, and I am afraid if they were to discharge their duties as inspectors of nuisances efficiently in other respects, they would have very little time to devote to the question of adulteration; at the same time there is no reason why their services should not be made available as far as possible, but there are already inspectors who ought to have from their calling a special knowledge of adulteration; I mean the detective inspectors in connexion with the Excise; they are scattered throughout the country; at all events, they are in all the ports, and in all the manufacturing and populous towns of the country; their services would be invaluable; in fact, the detection and prevention of adulteration is their exclusive business and occupation.

278. Their duties at present are confined to articles of Excise?—Yes.

279. Have you looked at this clause in the Bill to which I have referred, and is it sufficiently large in its terms to comprehend such inspectors as you would appoint?—It speaks of an inspector of nuisances only; unless adulterations could be defined to come under the head of nuisances it would not include them; it would be urged that some of the adulterations practised are not injurious to health; many of them are innocuous.

280. Mr. *Kinnaird*.] You recommend the appointment of inspectors; you are

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aware that the power of those inspectors of examining and reporting upon the goods sold by any tradesman would be a very large and extensive power, and likely to be abused; what check do you propose to introduce, or to what authority would you provide an appeal from the complaint of an inspector?—The duties of the inspectors I propose would be to keep a watch upon all articles, and judge as far as they could whether they are adulterated or not, and that when they had a suspicion, or even without a suspicion, they should make purchases from time to time in the neighbourhoods for which they are appointed, put the dates upon them, and the addresses of the persons from whom the purchases were made, and forward them to the Central Board, for their opinion whether the articles so purchased were adulterated or not, so that their powers would hardly be liable to abuse; the powers now vested in the inspectors connected with the Excise are much more extensive; they have the power of forcible entry upon premises of manufacturers and traders; I think that would seldom be required under an improved system of medical police.

281. Viscount *Goderich.*] Do not you suppose that adulterations must be carried on very extensively in shops in small country villages?—I have no doubt about it; but the practice of adulteration is so extensive and so general, that it is difficult to say where it does not prevail.

282. Would your inspectors be able to inspect small country districts?—My proposition was that those inspectors, though appointed in connexion with a town of some size and importance, should have a district assigned to them in connexion with that town and that district, would embrace the villages and smaller towns, to which they would pay occasional visits.

283. Mr. *Peacocke.*] Would not you require the inspectors to possess something in the shape of scientific knowledge?—It would be desirable that they should have a certain amount of scientific knowledge, but that is hardly to be looked for in general; if they were intelligent and trustworthy men, capable of acting under the instructions of the Central Board, that would be all that would be required; they would never have to pronounce upon the fact of adulteration; that would all come from a higher authority.

284. Would you propose that if they suspected a bottle of pickles in some village to be adulterated, they should send it up to the Board in London and have it examined?—Yes.

285. *Chairman.*] That of course would not be necessary in large towns; there, in all probability, you would have a higher class of inspectors, would not you?—It would still be necessary to communicate with the Central Board. I think analyses on a large scale would have to be conducted by the Central Board, because if that were not the case it would be necessary to have a number of small boards, and then the question of expense would come into play.

286. Mr. *Villiers.*] Who would you hold responsible for selling adulterated articles, the person actually vending them, or the manufacturer?—Both should be made responsible to some extent; the adulterator should be held responsible to the greatest extent.

287. In the case of a great many adulterated articles, they are sent from the large houses in London, or the large towns, all over the country, are they not?—That is the case with certain articles almost entirely.

288. In that case you would probably throw the *onus probandi* of who adulterated them upon the person retailing them; you would relieve him from responsibility if he showed that he purchased them in an adulterated state from another party?—It would be very desirable that an inducement should be given to the retailer to make known from whom he purchased the articles, and the state in which he purchased them.

289. If the retailer were made responsible, would not he examine the articles, or cause them to be examined before he sold them?—Yes; and I would make him responsible; but I would draw a distinction between the mere seller of an adulterated article and the man who adulterated it, because it may be that a person with a perfectly good intention may sell an adulterated article.

290. You said the other day that some of those adulterations took place in the commonest necessaries of life?—A large proportion of the adulterations discovered are in articles of necessary and daily use.

291. A very few of those adulterating ingredients increase the nutriment of the article, do they?—Very rarely indeed is an adulteration any improvement to the article sold.

292. So that it may happen that the very poorest people are defrauded by this adulteration, in paying as much for an inferior article as they would for the very best?—There is no doubt that the great evil of adulteration is that it presses with tenfold weight upon the poorer classes than upon the rich; the higher class of shops being able to demand a high price, they can afford to sell a genuine article, and they put themselves out of the way to get it genuine.

293. Whereas the poor man cannot change his tradesman, as the rich man in a large town can?—Not so readily.

294. He has no means of testing the article himself, but he is dependent upon the person who sells those things?—Certainly; absolutely so.

295. An inspector who could penetrate into the villages, you think, would be a great protection to the poor?—No doubt of it.

296. Mr. *Otway*.] What would you propose to do in the case of drugs; for instance, in the case of opium; how would you touch the vender of that article?—I think the importation of drugs should be especially watched over.

297. How would you punish the adulterator in that instance?—In that case it would be necessary to punish him by refusing to receive the article consigned to us, and sending it back to him; that would be necessary in the worst cases.

298. The opium we get comes from the factory of the East India Company, does not it?—A large proportion of the opium which is used in this country comes from Turkey. The best opium comes from Turkey.

299. Mr. *Sheridan*.] Do you think the genuine article would be increased in price by the prevention of adulteration?—In some cases.

300. Would that be the case with opium?—I should not think it would. Some articles would be increased in price if they were sold pure, but when they undergo an increase of price in consequence of being pure, it will generally be found that they will go further in use, so that the increase of price is not a loss; it is made up in the quality.

301. In sugar confectionery, for example; supposing a genuine article, without attempting to attract the eye, were sold, would it be sold at a greater price?—It would not be sold at the price that some adulterated sugar confectionery is.

302. Is the price increased in consequence of the colour?—In some cases it is, undoubtedly.

303. Mr. *Swift*.] You said everything was adulterated which would pay for adulteration; hence, if we were to have a genuine article, would not that in all cases advance the price?—The loss falls upon the consumer in general. The seller of an adulterated article is enabled to obtain a profit which he is not fairly entitled to; and though the purchaser may get it in some cases a little cheaper than he would if it were not adulterated, the greater part of the difference is pocketed by the seller.

304. Viscount *Goderich*.] You said that in the case of tea there was little or no green tea imported which was not adulterated?—There is very little; and as far as my experience goes, no tea, such as we consider to be green tea, imported into this country which is not artificially coloured. By green tea we understand a tea having a perceptible green colour; I know of no such tea which is not artificially coloured.

305. How would you propose to prevent that?—I would attempt to do so with care, and gradually. It would be necessary to cause some notification to be issued to the Chinese authorities, giving them warning that those teas would not be received after a time, and from the first rejecting some of the worst qualities sent over; rejecting of course lie tea which is not tea at all, but is made up of tea dust, gum, and sand, faced in different ways; that should be rejected at all times when offered for sale.

306. You mentioned the case of drugs and several articles which you said came into this country in an adulterated state; dealing with such articles would be a delicate matter and require great care, would not it?—It would no doubt, but the obvious course, when the article sent over was in a very bad state, would be to return it to those who sent it.

307. Mr. *Villiers*.] Would not it be soon understood by those who sent it that there was more care taken in this country in the examination of articles, and would not that lead them to send a better article?—Unquestionably.

308. We used to have green tea when the East India Company had the monopoly of supplying us; therefore the Company used to sell an adulterated article, just as we get it adulterated now?—I can hardly speak to that.

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309. You say, generally, there is no such a thing as tea really green unless it is coloured artificially?—I do say so; and, no doubt, if the tea sold by the Company had a bluish green or green colour, it was adulterated in the same way.

310. Where was it coloured; in China, or when the tea was in the warehouses?—Principally in China; imitations of Chinese colourings take place here sometimes.

311. Do you believe there are no essential differences between green and black tea except in the adulteration which is practised?—There are usually differences in the age of the plant and in the way the leaves are dried and prepared.

312. Lord *C. Hamilton.*] Does not green tea come from a different province in China?—Sometimes, but I believe it very often happens that both black and green tea are furnished from the same plant, the leaves being taken at different periods of their growth.

313. Mr. *Villiers.*] There has recently been a report on the subject, has not there?—Yes.

314. Was not Mr. Fortune sent out by the East India Company, and did not he report upon the adulteration of tea?—Yes.

315. Mr. *Sheridan.*] How do you account for green tea being colourless as compared with other tea?—It is not so highly dried, and the leaves are younger; the colouring substances do not yield the brown colour to the water so readily as black tea.

316. Mr. *Otway.*] You say the Assam teas are all uncoloured, even those which profess to be green; do you know any reason why the Assam teas are not generally used; are they of an inferior quality?—I find some Assam teas to be of a very tolerable quality; I think they ought to be more in use than they really are, though they are not equal to some of the finest Chinese teas.

317. Are they not equal to ordinary Chinese teas?—I should greatly prefer to drink them to the artificially coloured green teas of China.

318. *Chairman.*] Does not it take a good many years to mature the tea plant?—Two or three years, I think.

319. Not more than that?—I think not; I only speak from recollection.

320. Do you know whether we have any examination of drugs as they are imported into this country, on the part of the revenue?—If an Excise duty be levied upon that article, we have reason to presume that some examination of the article would take place, but if we may judge of the proceedings of the Excise from any publications made, I should say they seldom, if ever, take any notice of the adulteration of drugs.

321. Are you aware that in the United States, they have an examination of all drugs which are imported into the country, and in the event of their being found to be adulterated, they are sent back, and not allowed to be admitted?—Yes; and there the chief inspector reports most favourably of the working of the system. There are also laws with respect to adulteration of a very stringent character in Prussia. I have at home an extract from the Prussian law which defines what is considered to be adulteration, and the penalties, which are of a very stringent nature.

322. Mr. *Villiers.*] Do you know any other country where a system of inspection has been introduced?—In France there are some regulations of a rather stringent character bearing upon the question of adulteration; and with regard to certain articles there are such regulations in many continental states; as to milk, for example.

323. Is the authority left to the municipal body, or is it in the hands of the Government?—It is in the hands of the Government, in France and in America, and I imagine in Prussia also.

324. *Chairman.*] Has your attention been turned at all to the devising of any popular means of detecting adulteration; for example, with regard to Cayenne pepper, is it possible by putting it on the fire to detect any small globules of lead; or is there any means you are acquainted with in regard to that or any other article, which would enable the public to protect themselves?—In the publication of any treatise such as I suggested, with the view of giving plain directions for the discovery of adulteration, those matters would have to be fully considered.

325. Are you of opinion, that there are popular means by which that might be

be done?—Many adulterations can be detected readily by a non-scientific person; others require the exercise of very great care and skill.

326. Mr. *Swift.*] Do you know what are the remedial measures adopted in France, with a view of stopping adulteration?—I do not know exactly the law with respect to adulteration which exists in France, but I believe among the punishments inflicted there is imprisonment.

327. Mr. *Villiers.*] The inspection you propose would involve an extensive machinery?—Yes; but not so extensive as the present machinery which is in operation in the Excise. The Analytical Board of the Excise would have to be made of a more comprehensive character.

328. Would you appoint local inspectors who should be obliged to examine any article which might be brought to them, upon the payment of a small fee, or on being remunerated by the State?—That might be done in some of the large towns.

329. So that if a poor man suspected his tea were adulterated, he might take it to the officer and ask for an analysis?—That might be done in many of the large towns no doubt, with great advantage.

330. You could hardly leave it in the hands of the municipal authorities, because the persons composing the municipality would be persons engaged in particular trades themselves?—I am afraid it would not be properly carried out if it were left to the municipal authorities.

331. But the inspectors possibly might be appointed by the county, or by the Government, who should have these functions?—Yes.

332. That, you think, would be a great protection to the poor?—I have no doubt of it.

333. If everything that was to be analysed were to be sent to the Central Board, would not their duties be enormous?—It would not be necessary that everything to be analysed should be sent there. The central body would at first, no doubt, have a great amount of work to do, and periodically it would publish the results of that work, giving the names of a certain number of individuals weekly. This would have an important effect in putting a stop to adulteration. A great number of persons who now practise it would give it up altogether, and, as adulteration was more and more detected and exposed, it would be practised more and more rarely, so that gradually the labours of the Central Board would be much reduced.

334. *Chairman.*] Have you any idea what is the cost of the establishment now employed by the Board of Inland Revenue?—I have not; I have often wished to learn what the cost of the analytical department of the Board of Excise amounted to, and also of the inspecting department.

335. Lord *C. Hamilton.*] Supposing there was ground for prosecution in any case, what party do you propose should conduct the prosecution; it should not be conducted at the expense of the poor purchaser, should it?—No; the case might be heard probably before a magistrate, without any formal trial.

336. What occurs now under the Excise?—I believe they inflict fines absolutely.

337. Have not the magistrates summary jurisdiction in such a matter?—The magistrates can deal with such a case, if brought before him by the Excise.

338. Is not the Excise officer the person called before the magistrates in any case of adulteration?—If the Excise took the course of bringing the case before the magistrate, the Excise officer would furnish the evidence which was necessary.

339. Do not you think the prosecution should be at the expense of the public. If you appoint a public officer for the purpose of inspecting these articles, should not he bring the case before any local court, instead of its being done at the expense of the person who has been imposed upon?—Certainly; it is very desirable that the person imposed on should be relieved from responsibility and expense as far as possible.

340. If at any time the inspector sees that there has been adulteration, it should be his duty to carry on the prosecution, and not that of the party who originally called his attention to the fraud?—That would be very desirable, in order that the system might work properly.

341. Mr. *Sheridan.*] Have you any idea what the cost would be of a body of inspectors throughout the country, such as you recommend?—I have not formed any estimate upon that point.

342. Mr. *Swift.*] If worked in conjunction with the Excise, the expense would be

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be very much less, probably?—No doubt of it; and I think the working expenses might be rendered less than they are at present. But at the same time we must not look at the question simply as one of expense; we must look rather to the important consequences which would result from suppressing adulteration in a variety of ways.

343. Viscount *Goderich.*] What class of persons are the inspectors now employed under the Board of Excise?—Some of them, I believe, are very respectable and trustworthy men. There have, however, been complaints about their conduct from time to time.

344. Are they persons of such a description as you would desire to have employed as inspectors?—I think in many cases they are. Speaking generally, I think they would answer the purpose very well. One would prefer to make a somewhat different selection, but if the machinery already in existence could be made available, this course would possess some advantages.

345. Would they be persons able to make any analysis of adulterated articles?—I think the analyses would have to be conducted chiefly by the central Board, and by persons specially appointed in certain of the leading towns throughout the country.

346. Those persons specially appointed would be other than the persons who are now employed as inspectors by the Board of Inland Revenue?—Yes. None of the present inspectors of the Excise would, so far as I am acquainted with their qualifications, be fit to make any scientific examinations with a view to detect adulteration.

347. Mr. *Villiers.*] The people employed by the Excise do not examine adulterated articles, do they; their duty is chiefly to discover spirits which are in illicit places, or which are under proof?—They also attend to adulteration in pepper, tobacco, beer, and cocoa.

348. Mr. *Kinnaird.*] Could one of those ordinary inspectors make use of the microscope?—Not an ordinary Excise inspector; that requires a little special education; but there are a great many microscopic observers scattered throughout the country who are quite capable of detecting adulteration by means of that instrument.

349. Mr. *Peacocke.*] You are aware that there is great objection frequently expressed to a central Board; do not you think that every county might have its own body of analysts?—I think there must be some head to such a body; I think if every county had its board of analysts it would increase the expense; and the whole thing should be worked under one head in some form or other, so that the reports might be published together, and the conclusions and effects following from what had been done might be made known to the public.

350. Mr. *Otway.*] Will you refer to your answer to Question 128; you say in that answer, "There are analyses conducted on a large scale in India by the East India Company before they sell the opium; they have inspectors to examine the opium as it is brought to the factory by the different growers, and sold to the Government." Then the question is put to you, "Is it adulterated before it comes to the Government?" and you answer, "Yes, it is adulterated by the grower before it is brought to the factory." Do you mean that the East India Company are parties to the sale of an adulterated article?—No, quite the contrary; the crude opium is sold to the Government at their factories, and the Government have appointed inspectors, who examine that crude opium before they make the purchase, to see whether it is adulterated or not; if it be adulterated they would reject it. As far as I am informed of the facts, the East India Company seem to take considerable pains to obviate the risk of adulteration in the article of opium.

351. Do you mean that the article, as it comes from India, is never adulterated?—I cannot say that it is never adulterated; I know that precautions are taken to ensure its not being adulterated.

352. Mr. *Kinnaird.*] As far as you are aware, the East India Company are clear of all participation in the adulteration?—As far as I am acquainted with the facts they are.

353. Mr. *Otway.*] I suppose, therefore, there must be a deficiency in the power of their inspectors?—I have explained before that a great part of the opium which comes to this country is not East Indian opium, it is Turkey opium. It is quite possible that some proportion of the opium which comes from the East Indies reaches this country in an adulterated state. There are adulterations which it would

would be very difficult to detect, and which would not be detected except upon minute examinations, which they are not very likely to carry out, and which they are not, perhaps, able to carry out. *A. H. Hassall*, M.D. 18 July 1855.

354. Should you say, generally, that East Indian opium is a better article than the article from Turkey?—It is not a better article, but, I believe, it is less adulterated.

Robert Warington, Esq., called in; and Examined.

355. *Chairman.*] I BELIEVE you have been connected for many years with the Apothecaries' Company?—I am the Chemical Operator there, and resident director. *R. Warington*, Esq.

356. From your connection with that company your attention, no doubt, has been a good deal devoted to the consideration of adulteration, and especially in the article of drugs?—It has.

357. You have not confined your attention, I believe, only to drugs?—No; I also follow my profession as a consulting and analytical chemist, and I have continually adulterations brought to me to examine.

358. Have you examined the article of tea, in particular?—I examined the article of tea some years back, in 1844, rather accidentally than otherwise; I was drawn into the examination more as a point of chemical interest; two samples of green and black tea were brought to me by an Excise officer, who had made a preliminary seizure in the neighbourhood of Kennington; he wished to know if those were genuine teas. I requested him to get further information as to the identification of the samples with the bulk of the teas, and he was to see me again. He never, however, called again. The samples lay before a window, and one day seeing the sunlight upon the surface of the green tea, I was very much surprised with the varying tints. I then examined it microscopically, and I found the whole of this green tea was faced with a colouring material.

359. What was the nature of that colouring material?—The colouring matter consisted of Prussian blue, turmeric, and a white material which seemed to be a mixture of soap stone or steatite with sulphate of lime. I then made a number of inquiries among the influential men in the trade, and at the East India House, to ascertain whether this was done before it came into this country or not. I obtained a number of, to me, very interesting samples. On calling at one of the large tea warehouses and mentioning what I had observed, they said immediately, "Have you examined the unglazed tea?" I was very much struck with the term "unglazed." I asked them what they meant by "unglazed tea"? They said, "We have two kinds of tea in the trade, what is called glazed tea and unglazed tea." I said I should wish very much to see a sample of unglazed tea. They then showed me a sample which had no green colour at all; it was of a dull slate colour. On examining that, I found no turmeric, and a very small quantity of Prussian blue; there was still a quantity of sulphate of lime upon the surface.

360. Mr. *Villiers.*] Was this as it was imported?—It was.

361. Mr. *Sheridan.*] What was the name of that tea?—It was called unglazed tea; it was a green tea. The samples I now produce (*producing the same*) are all unglazed teas.

362. Are those all ready to be glazed; are they the sort of teas which are glazed?—Yes, but the glazing is very often put upon the black tea.

363. Was this wholesale teadealer going to glaze them?—No.

364. How came he with unglazed tea?—He would sell it as unglazed tea; here (*producing the same*) is a sample of tea supplied under the East India Company's Charter; there is a very slight glazing upon that.

365. Mr. *Villiers.*] Where did they use to glaze their tea?—That was glazed at Canton, by the Chinese.

366. Mr. *Swift.*] Is the adulteration in the way of glazing employed for the purpose of adding to the weight of the tea, or merely to make it more attractive to the eye?—For sight entirely, I believe.

367. Mr. *Sheridan.*] What is the sulphate of lime for?—I do not know; I believe it is to make it stand the sea voyage, rather than anything else.

368. Mr. *Villiers.*] Are not there peculiar properties in what we call "green tea," and do those wholly arise from the glazing?—No, from the way in which the tea is cured.

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369. There is something which we call "green tea" which is a really different article from black tea?—Unquestionably; the black tea undergoes a fermentation; they cannot dry it black unless it has undergone a process of fermentation.

370. Is there any difference in the original plant?—No; they very often make green and black tea from the same plant; if we take a plant which is rich in nitrogen, and allow it to ferment a little, and then attempt to dry that, it dries brown or black, but if we dry it immediately it is gathered it dries green.

371. What is the precise purpose of this Prussian blue?—It is used very frequently for damaged teas, or to suit the eye of the merchant who purchases. The American teas are much higher glazed than ours are.

372. *Chairman* (*reading from a Paper on Green Tea by Mr. Warington.*)] Mr. Reeves, who was one of the company's inspectors, says, "The colouring is not intended as an adulteration; it is given to suit the capricious taste of the foreign buyers, who judge of an article used as a drink by the eye instead of the palate. You well know how little the London dealers even now like the yellowish appearance of uncoloured green tea. The Americans, a few years since, carried the dislike even further than the English, and therefore the Chinese merchant had scarcely a chance of selling his tea unless he gave it a 'face' that would suit their fancy. The small quantity of colouring matter used must preclude the idea of adulteration as a matter of profit." Do you concur in that observation?—Perfectly.

373. Is Prussian blue at all injurious to health?—No, I should think not; it is a very insoluble substance.

374. What were the other materials you spoke of?—Turmeric and sulphate of lime.

375. Are they inoffensive?—They are.

376. Could any one easily ascertain if those properties were present in the tea?—Unquestionably, the sight of the tea alone is sufficient.

377. Viscount *Goderich.*] You do not consider, then, that the glazing is injurious to health?—Not in any moderate extent; some of the highly glazed teas might have an injurious tendency; it is quite a medical question, but I should think it would depend upon the state of the stomach and the organisation of the person.

378. Mr. *Villiers.*] Can they glaze sloe leaves?—Yes, anything. Glazing is a finishing operation, and anything can be glazed. The lie teas are glazed; they contain very little tea indeed.

379. What are lie teas?—They contain about 50 per cent. of earthy matter.

380. Have they anything to do with the tea plant at all?—Nothing; those are sold by the Chinese to the English merchant.

381. Is the term "lie tea" used by the Chinese?—Yes.

382. Mr. *Wise.*] Do they mean by that that it is false tea?—Yes.

383. Viscount *Goderich.*] Is this tea imported into this country as lie tea?—By the merchant it is, not beyond the merchant. These samples were put into my hands for examination by a merchant in London, in order to stop the introduction of these teas here. He sent back a report of the examination to Canton, and had it published in the papers there.

384. Is it known to be lie tea by secret marks or by any public marks?—It is known in the trade very well as lie tea. The brokers know them as lie teas.

385. Mr. *Villiers.*] Is a great deal of it imported?—There was an immense quantity imported, and they endeavoured to import it as manufactured goods, so as not to pay the tea duty; but the Customs would not allow that; they said, "What do you mean to do with it after it is passed?"

386. The wholesale trader knows perfectly well what the meaning of lie tea is?—Yes.

387. What name does he give it after he has imported it as lie tea?—I cannot tell.

388. Is not there such a thing as lie gunpowder tea?—Yes.

389. What does that consist of?—I think it contains 37 or 40 per cent. of earthy matter.

390. What is the earthy matter?—Merely inorganic matter in the tea which will not burn away; so that by taking 100 grains of tea, and calcining it in an open vessel, you obtain 40 or 50 grains of matter unburnt.

391. There is no virtue in that, is there?—None at all.

392. What is the rest of the lie tea?—The rest consists of colouring matter, rice

rice flour, and tea-dust, the sweepings of the floors in which the tea has been cured.

393. Is this an article which is sold very generally?—No; I believe lie teas are not now imported in such very large quantities.

394. You said they were formerly so; how recently was that?—I understood there was a quantity of them in bond at Liverpool, but the Customs would not allow them to pass unless they paid the tea duty; then the consequence would be that they would re-export them to some colony or some place where they could sell them.

395. Mr. *Kinnaird.*] Are the Committee to understand that our Government would pass the lie tea, knowing it to be no tea, upon the payment of duty?—I do not know that; they have nothing to do with the adulteration; the merchant enters it as manufactured goods, and the Customs officers say, "This is tea, and you mean to sell it as such, and therefore you must pay the tea duty."

396. Viscount *Goderich.*] Do you conceive that the officers of the Customs could detect the difference between the lie tea and real tea?—I do not know.

397. Mr. *Villiers.*] When the company had a monopoly of the supply, and there was an *ad valorem* duty, did they employ tasters and inspectors at the ports?—Yes, they had inspectors at Canton always.

398. Do you think we had purer teas at that time than we have had since the trade was thrown open?—There is no question of it.

399. Would not it have been a source of profit to the company to import lie teas?—No doubt, if they sold those lie teas at the same rate as the higher class of teas.

400. Have you any reason to suppose that they did not do it, or that they did?—No, I cannot say.

401. Mr. *Swift.*] Was there no lie tea imported at that time?—Not that I have heard of; I believe it is quite a modern introduction.

402. Mr. *Kinnaird.*] Since the opening of the trade?—Since the demand of the merchant for a cheaper article.

403. Mr. *Otway.*] Are those lie teas chiefly consumed by the lower classes?—I imagine they would be very cheap teas, and therefore be likely to be consumed by the poorer classes.

404. Mr. *Villiers.*] What is the duty upon tea?—The duty was 2*s.* 1*d.* a pound; I am not sure what it is now.

405. Viscount *Goderich.*] Do you suppose that this lie tea is ever sold unmixed with real tea?—I should think so.

406. Mr. *Villiers.*] Supposing an inspector or some person of the kind were trained for the purpose of investigating such cases, do you think he could so easily ascertain whether a sample of tea were really tea or not as to enable any poor man to take his tea to him, and obtain a report from him on the subject?—Certainly; if you pour boiling water upon this lie tea it falls to pieces at once; the gum and starch which unites the materials is dissolved, and the thing is reduced to powder.

407. So that if there were an inspector every person might ascertain whether he were drinking real tea or lie tea?—No doubt; the calcining the material over a lamp would detect the adulteration.

408. Supposing this rubbish were imported, what would it cost at any port without the duty?—The value given me by the merchant was from 8*d.* to 1*s.*

409. What do you suppose a poor man would pay for lie tea; 3*s.* 6*d.* a pound?—I have no idea; at any rate, there would be the duty of 2*s.* 1*d.*, which would bring it up to more than 3*s.* a pound at once.

410. If he had paid simply for what he had got he would not have paid so much?—Certainly not; there are leaves which are rolled up into the form of tea which come from China, which are not tea at all.

411. Is tea sufficiently expensive in China to make it worth while to do that?—I imagine so.

412. *Chairman.*] They do not use that for their own consumption?—No; I understand they never touch those glazed teas in China.

413. Is tea an article of general consumption among the Chinese?—Very much, I am told.

414. Viscount *Goderich.*] The poorest people in China, you think, do not drink those adulterated teas?—I understand they are never drunk at all.

415. And, of course, not this lie tea?—Certainly not.

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416. Mr. *Swift.*] Is the lie tea generally sold by itself, or is not it bought by retail dealers, and used for mixing with other teas?—That I cannot tell; I know it is mixed by the merchant at Canton, or at the Chinese port, with genuine teas, and sent over. In some of the samples analysed (*see* Paper on "Lie Teas") the Committee will see that the mixtures containing lie teas contain from 11 per cent. of earthy matter to 24½, whereas the lie teas contain 40 per cent. of earthy matter.

417. Mr. *Villiers.*] Have you followed those teas into the different places where they are distributed?—I have not to the retailer.

418. You have found, at times, that the wholesale dealer is conscious that he is distributing for tea that which is not tea?—Perfectly so.

419. And the retailer is aware, by the price he pays, that it is not a genuine article?—That I cannot say. I should imagine, a man in his senses must be aware that he cannot buy the genuine article at the price he would give for this adulterated article.

420. Are there any wholesale dealers who are aware of this, and will have nothing to do with it?—I should imagine a respectable house would not look at such an article; they generally taste most of their teas before they purchase.

421. *Chairman.*] Do not you consider it very objectionable that Government should allow its officer to admit that which you say is not tea as tea, merely for the purpose of the revenue?—It is a question whether it comes under their province. If a party were to attempt to pass goods under a different name from what the officer's common sense would show him they were intended to be sold as, he would stop them.

422. Viscount *Goderich.*] Do you consider that the greater part of the adulteration of tea takes place before it comes to this country?—I have no doubt of it.

423. Are there any places where adulteration does take place here?—There have been such places; there was a place at Manchester where tea-leaves and other leaves were collected and coloured in imitation of green tea; I procured one sample, but I had very great difficulty in getting it, and soon after that, I understood the manufactory had stopped altogether.

424. Is there any truth in the statement that sloe leaves are sold here for tea?—I do not know.

425. Since when is it that you have ceased to analyse tea?—In August 1851 I laid the last communication on the subject before the Chemical Society.

426. Are the Committee to understand that you took the samples you analysed by chance?—All my samples were obtained from the merchants and the brokers, none of my samples came from the retailers; in fact they all came from the first hand.

427. *Chairman.*] From parties who were aware of the adulteration?—Perfectly so.

428. Mr. *Sheridan.*] You have had no means of procuring a sample of tea manufactured in England?—No.

429. Mr. *Villiers.*] Do you know anything of tea being adulterated in France?—Not at all.

430. Mr. *Peacocke.*] Do you mean that the glazing always takes place before the tea comes here?—Yes, I believe the whole of it, with the exception of the case I have mentioned of the establishment in the neighbourhood of Manchester, which was in existence.

431. Lord *C. Hamilton.*] That did not answer, did it?—I do not know; it ceased.

432. Your impression is, is not it, that the greater proportion of the adulteration takes place abroad?—I believe very nearly the whole does so.

433. This "Lie Tea," which is never sold pure, is entirely an article for the purposes of fraud, is not it?—I think the fraud is on the part of the English merchants.

434. Do not you think the Government might refuse to receive import duties upon an article which is only intended for the purposes of fraud?—If they knew anything about the matter, that is the difficult point. The merchant enters his goods; the Government passes them, and takes the duty upon them.

435. Do not they enter them, stating the qualities of the different teas as they enter them?—They do not enter them as "Lie Teas;" in the case I alluded to they entered them as manufactured goods.

436. Do you think that is a general practice?—I cannot answer that question.

437. Mr.

437. Mr. *Villiers.*] Are not you aware that *ad valorem* duties have been generally abolished, owing to the difficulty of determining the quality of the article?—Yes, I believe so.

438. Mr. *Sheridan.*] Are you aware that Dr. Hassall has stated that the leaves used at tea and coffee-houses have been bought up and resold as a genuine article?—I understood that the object of this establishment in Manchester was to collect and glaze and colour those materials.

439. Mr. *Villiers.*] You do not know the extent to which adulteration is now carried on in the article of tea?—No.

440. Have you told the Committee all the articles which are used to adulterate teas?—I think so.

441. *Chairman.*] I believe you have also some evidence to give upon the subject of the adulteration of drugs?—Yes. The adulteration of drugs does not often come under my notice, because we buy the best quality in the market, and everything is ground and prepared on our own premises.

442. Are you aware that there are great adulterations practised in the article of drugs?—Yes.

443. Do not you import largely yourselves?—No.

444. Mr. *Villiers.*] Do you take any precaution against purchasing drugs which have been adulterated abroad?—If a certain drug which is imported is always adulterated abroad, we cannot prevent that; we take the best the market will afford; we cannot go beyond that.

445. You do not test them, do you?—Yes, we always do so.

446. Is the public sure that what they buy at Apothecaries' Hall is pure?—It is the best which can be obtained in London.

447. How far does that assurance go as regards its actual purity?—It goes thus far: no cake of opium, for instance, is absolutely pure, because the juice which is obtained from the poppy will only dry to a certain consistence, and then they take some of the leaves which grow in the district, and they bring it into a cohesive state by putting in a quantity of those leaves. That is to a certain extent an adulteration; but it is a matter of necessity.

448. Do you test all the articles which you buy in the market?—Everything.

449. Do you find that some things which are imported from abroad are not pure, but are to a great extent adulterated?—Certainly; for example, with regard to the article of scammony. The price in the market is one great criterion of purity; scammony varies from 5*s.* per lb. to 40*s.* per lb.; opium varies from 7*s.* to 18*s.* a lb.; many of those opiums, as Egyptian opium, contain no morphia at all, which is the active principle of opium.

450. *Chairman.*] For what is scammony used?—It is used as a purgative; it is the leading article in compound extract of colocynth.

451. Mr. *Villiers.*] What is the effect of opium which has no morphia in it?—It produces a violent effect upon the brain, from the quantity of narcotine which is in it; the true sedative quality does not exist in any large quantity in the Egyptian opium.

452. Suppose you discover that to be the case with any opium, do you sell that opium out again?—We should never buy such opium.

453. Suppose a person does purchase opium at Apothecaries' Hall, can he depend upon its having a certain amount of morphia in it?—We cannot say a certain amount, because every season will vary the quantity of the active principle of opium.

454. If a person purchases opium at Apothecaries' Hall, then he cannot tell with certainty what the effect will be?—We know pretty well what the average per-centage of morphia is in the best kinds of opium.

455. Does not it vary considerably according to the amount of adulteration which is practised in the country?—We buy the most genuine article which comes to the London market, irrespective of price, and we test it before buying. The system of buying is this: every Saturday a public list is suspended in the outer part of the counting house, for the whole drug trade, brokers, or merchants or importers, of the things which we wish to buy the following week. Before one o'clock on the following Tuesday, any one who wishes may send samples. There is a committee of medical gentlemen, which is called the Buying Committee, attended by the principal chemical officer and myself. Those samples are all laid out; they are tested, and the best of them selected.

456. You acknowledge that the opium sold at Apothecaries' Hall is occasionally

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adulterated, and you say it is impossible to prevent it?—If you can call it an adulteration; it is a matter of necessity.

457. Have you a standard beneath which you would not purchase it?—Certainly; and irrespective of that we make a preparation to purify it, and to make it always of a constant quality; that is, we have a preparation called "Strained Opium;" the soluble portion of the opium is dissolved, and the insoluble portion filtered away, and it is again brought to the state of extract.

458. So that a physician ordering a prescription containing opium, if that opium were purchased at Apothecaries' Hall, could tell, with more or less certainty, what the effect of the prescription would be?—With very great accuracy indeed.

459. Mr. *Villiers.*] Do you perform this system of rectification upon all the drugs you buy?—Quite so; any party may have the article either in its crude state or in a purified state.

460. You say you generally grind your own drugs. From inquiries which you have made in the trade, is it your opinion that a great deal of adulteration takes place on the part of the grinder?—We were forced to grind our drugs by the fact of that adulteration. Even when the Society of Apothecaries sent a man to the drug mill to superintend the grinding of their own drugs, he was taken down to dinner, or to lunch, or to something of the kind, and all kinds of tricks were played with their drugs.

461. Viscount *Goderich.*] It has been stated in evidence, that the greater part of the adulteration which takes place in the grinding of drugs is the result of a requirement upon the part of the persons sending drugs to be ground, that the same weight should be returned after grinding, as was sent previously; have you any information upon that subject?—No; I have no experience upon the matter. If such a thing is the fact, it must be a great absurdity; in grinding such a substance as ipecacuanha, the loss is fully 10 per cent.; the centre part of the ipecacuanha root is a strong woody fibre, which they could not reduce to powder.

462. In the case of the adulteration you have just alluded to, it was the grinder for his own benefit who adulterated the drugs sent him?—Yes.

463. *Chairman.*] Do you know the article which is called "powder of Post"?—I am aware of the existence of such an article, but I never succeeded in obtaining a sample of it.

464. Do you know what it consists of?—I do not; I know that there is such an article, and that it is commonly sold by certain parties.

465. Mr. *Swift.*] You said you bought your own goods by sample?—Yes.

466. What process do you adopt in order to ascertain the genuineness of the article?—A chemical or microscopical examination. In the case of arrowroot, for example, we select first all the best samples in point of appearance, and they are tested by the microscope, and the strength of the jelly each one will make as compared with the others.

467. How do you insure that the quality is equal to the sample you receive?—Besides the Buying Committee we have an Inspecting Committee, no individual of which is a member of the Buying Committee, to inspect the bulk as compared with the samples, to see that they are equal; if any article is not equal, it is rejected at once.

468. *Chairman.*] Have the Apothecaries' Society any power of entering the premises of chemists and druggists?—None at all; I believe the corporation have a power of visiting medical practitioners, that is apothecaries' shops; there are two bodies in the Apothecaries' Company; the Corporation, and the Joint Stock formed from among the members of the Corporation. It is the Joint Stock formed from among the members of the Corporation, which constitutes the trading department. The Corporation have the power of examining medical practitioners, and have nothing to do with the trade.

469. Have the Corporation any power of entering chemists' shops?—They have the power of visiting apothecaries' shops, but not those of chemists and druggists.

470. Viscount *Goderich.*] Do they ever exercise trust power as respects apothecaries?—They have not done so for some years; there was so much resistance made to it on the part of many persons.

471. Mr. *Villiers.*] Have you any suggestion to make for the protection of the public against these frauds in drugs, except that they should buy them at Apothecaries'

Apothecaries' Hall?—No; one point would be to have an examination of them on importation, but after they have passed that barrier you have no check; you may make arrangements to check their importation, but you have no check afterwards, and directly they have passed the barrier the things are adulterated.

472. Do you think it possible to appoint persons who would be sufficiently qualified as local inspectors to judge of the adulteration of drugs?—It might be done.

473. Do you think it might be carried out by extending the machinery of Apothecaries' Hall?—No, I do not think they are in a position to undertake anything of the kind; the College of Physicians have the power of visiting the shops of chemists and druggists, and I believe they make every year an inspection, but it must be very cursory; it is only I believe at one period of the year in which it is done; they always come round to our establishment.

474. And it is pretty well known when they come, perhaps?—No, we have not five minutes' notice of their coming.

475. Mr. *Sheridan.*] Does the examination extend to the country?—I believe not.

476. Viscount *Goderich.*] Suppose upon that examination they should detect any adulterated drugs, do you know what proceedings they would take?—I do not.

477. *Chairman.*] Do you think the exercise of that power has tended in any way to diminish the adulteration of drugs?—I do not think so; it is not sufficiently searching.

478. Mr. *Peacocke.*] Even in your own case, though you may not know the precise time the College of Physicians will pay you a visit, do not you know about the time?—No, we never know the time.

479. Did not you say it was at one particular time of the year they came?—I should rather say it is once* in the year; our establishment is open to inspection from the Army Board, and the Admiralty; instead of there being an inspection of the orders which are put up for the Navy, the whole establishment is open to inspection continually.

480. With respect to the College of Physicians, it is once a year they make their inspection, but not at any precise time of the year?—I believe so.

481. Mr. *Kinnaird.*] Is it the practice of the department of the Admiralty to examine your establishment?—They have never done so while I have been there, but it is a part of the agreement between the society and the Admiralty that it shall be open at any period for inspection.

482. Do you supply the chief part of the drugs for the army and navy?—The whole of the drugs for the navy, and I think at the present time one-half for the army, and the whole for the East India Company.

483. Who supplies the other half?—I think Messrs. Savory.

484. Do you supply the lime-juice?—No.

485. Are your prices relatively much higher than those of retail druggists?—They are higher, but I think the profits of the society are much less than those of any ordinary establishment.

486. The higher price is due, I suppose, to the superior quality of the drugs?—It must necessarily be so. In buying rhubarb, for instance, we have every piece of rhubarb cut through the middle to see that it is sound.

487. Are you aware that Turkey rhubarb, or that which purports to be Turkey rhubarb, is manufactured very largely in this country, and sold as Turkey rhubarb?—Not from the grower; it may be afterwards. I know, in the neighbourhood of Banbury, there is a grower who vends upwards of 20 tons of English rhubarb in a year to wholesale druggists.

488. Mr. *Sheridan.*] Is that inferior to Turkey rhubarb?—Yes; it fetches about 4 *d.* a pound; the best Russian rhubarb fetches 11 *s.* 6 *d.*

486. *Chairman.*] Is it not covered with powdered Turkey rhubarb, and sold as Turkey rhubarb?—It may be; I do not know the fact.

490. Viscount *Goderich.*] Has English rhubarb any medicinal effect?—It has; but it must be a most enormous dose which must be taken.

491. Mr.

*Since giving the above evidence I have been informed that the visitation of the Royal College of Physicians is conducted three times in the year.

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491. Mr. *Swift.*] It is not injurious, is it?—No; I believe at some of the hospitals they have used it.

492. Mr. *Wise.*] Is the Turkey rhubarb grown in Turkey?—No; it is a monopoly of the Russian Government.

493. In what part is it grown?—In the Tartar districts; there are only a certain number of chests allowed to be sent out of St. Petersburgh annually.

494. Is there no rhubarb actually grown in Turkey?—No; we get no rhubarb from Turkey; from China we get large quantities.

495. Mr. *Kinnaird.*] You have told us the price of common Turkey rhubarb; what is the price of the best Turkey rhubarb from St. Petersburgh?—That is 11 *s.* 6 *d.*; the China rhubarb, which is commonly called Turkey rhubarb, is about 7 *s.* 6 *d.* at the present time.

496. Mr. *Peacocke.*] Many druggists profess to sell drugs from Apothecaries' Hall; do you supply them in all cases?—No; we supply very few indeed.

497. Have you taken any proceedings against those who profess to be supplied by you, but are not?—No.

498. In cases of fraud which may be carried on under your name, by persons saying that they are supplied with their drugs from you, when they are not, should you feel justified in interfering, and seeking to punish the parties?—I think it should be done; but it has not been done. It sometimes happens that people will purchase one or two articles from us, and then they will state they get their medicines from Apothecaries' Hall.

499. Mr. *Kinnaird.*] You would find it very difficult to convict in such cases, would not you?—I have no doubt we should.

500. Viscount *Goderich.*] You purchase a good deal of arrowroot you say?—Yes.

501. Is there not a good deal of adulteration practised in the case of arrowroot?—It is rather a matter of mixing than of adulteration; the price of arrowroot varies from 3 *d.* a pound to 1 *s.* 6 *d.*, but they are all true arrowroots; you have Jamaica arrowroot and African arrowroot, at 3 *d.* a pound.

502. Is not potato flour used for the purpose of the adulteration of arrowroot?—Potato flour is as dear as African arrowroot.

503. Would a sample of arrowroot consisting entirely of potato flour be equally nutritious and good for a sick person?—It would not form so good a jelly, nor would it be so palatable; the low descriptions of arrowroots are very inferior; indeed they are dark in colour and bad in flavour.

504. Mr. *Villiers.*] Do you supply the Government stores by contract?—No, not by contract.

505. Is the Society bound to supply the best articles?—In the case of the navy, we make a tender of prices every three or six months, at their option; at the present time it is for six months; when that expires we must send in a list again, with the prices which we shall charge for the next half year.

506. Is there any one to compete with you?—No, they call upon us to send in a list at the end of every period; the present period is a six months' period; we send in a list and they accept it for three or six months.

507. Do the prices vary much?—Yes, according to the state of the market; In the case of the army we do not furnish any list of prices, but we supply them at the market prices of the day.

508. *Chairman.*] Do you deal as a company in cod liver oil?—Very largely.

509. Is not that an article which is very largely adulterated?—Very largely indeed.

510. And is not the adulteration of a very fatal kind, that is to say, if it is administered to a patient in large quantities it may have no effect whatever in averting consumption, whereas pure cod liver oil is very often exceedingly beneficial?—We have an agent in Newfoundland, and we take the whole of his make; he contracts for the livers with the fishermen, and the oil comes direct to us.

511. Would you say from your experience, that there is an immense amount of adulteration in cod liver oil?—Yes; we know that even in Newfoundland the livers of all kinds of fish are taken, and the oil comes over as cod liver oil.

512. Mr. *Kinnaird.*] Does it vary much in price?—It does, very much.

513. What is the price of your best cod liver oil?—I am not prepared to say; those prices are fixed in the retail shop.

514. Are you of opinion that Norway oil is not equal to Newfoundland oil?—It

—It may be; if the fish are in as healthy a state there is no reason why they should not yield as good oil. *R. Warington*, Esq.

515. It is of a different colour, is not it?—In the brown cod liver oil the livers have been allowed to putrefy to some extent. 18 July 1855.

516. Dr. Jongh's is refined, is not it?—I do not know.

517. *Chairman.*] Do you know what adulteration it is which is practised in cod liver oil?—It is adulterated with all kinds of oily materials; in some cases it is not cod liver oil at all.

518. Mr. *Swift.*] Is the adulteration easy to detect?—No, it is exceedingly difficult; there are certain tests which have been published as tests for cod liver oil, but if there is five per cent. of cod liver oil in the specimen, it will yield the same indications to those tests.

519. Mr. *Wise.*] It is entirely a question of confidence therefore?—Yes, entirely so.

520. Mr. *Swift.*] Have you analysed any other article of food or drink than those you have mentioned?—I had several specimens of mustard through my hands some short time back.

521. Is that much adulterated?—Very frequently; some of those samples contained from 27 to 30 per cent. of inorganic matter, sulphate of lime principally, the genuine mustard yielding from $4\frac{1}{2}$ to $6\frac{1}{2}$ per cent., so that the difference would be very great.

522. *Chairman.*] Have you any other observations to make to the Committee?—Isinglasses have been very much adulterated. I had occasion to examine them some time back.

523. With what were they adulterated?—With ordinary gelatines.

524. Mr. *Sheridan.*] Is quinine at all adulterated?—It is sometimes very largely adulterated.

525. A large quantity was sent out to the army in the Crimea; did that come from Apothecaries' Hall?—We have sent out enormous quantities of quinine to the Crimea, and to the East Indies we send a very large quantity.

526. Lord *C. Hamilton.*] Is not chloroform sometimes very much adulterated?—There are adulterated chloroforms in the market, unquestionably, but there are three or four makers who make perfectly pure chloroform.

527. Being a dear article it is of course the more subject to adulteration?—The price has come down very much of late; we do not consider chloroform a dear article now; it is made in such large quantities, and made so well, that there is not so much opening for adulteration.

528. *Chairman.*] Would there not be peculiar danger attending the adulteration of chloroform?—Even in the case of genuine chloroform there is danger if it has been kept a long time; it undergoes decomposition by the reaction of the elements on each other; if it is exposed to the sunlight for a few hours it would contain muriatic acid; the elements would re-act upon each other, and it would become a dangerous material; it should always be washed with water before it is administered.

528*. Do you think its failure sometimes in operations is occasioned by adulteration?—Not so much by adulteration, I think, as by the action of the elements on each other, and the formation of muriatic acid.

529. Is not quinine an article which is very much used in workhouses, and in medical practice among the poor?—I cannot say whether it is much used in workhouses.

530. Mr. *Knight.*] You say that quinine is very much adulterated?—Yes, it is; and there are a great many organic bases allied to quinine; there is the quinidine and cinchonine, for instance, that are obtained from a bark just in the same way as quinine, but they have not the same febrile effects.

531. Mr. *Wise.*] Have you ever examined the numerous patent medicines and pills which are extensively bought by the working classes?—No, I have never been called on to examine them.

Alphonse Normandy, Esq., M.D., called in; and Examined.

532. *Chairman.*] YOU are a physician, are you not?—I am a physician, but I do not practise as a physician; I am a professional chemist. *A. Normandy*, Esq., M.D.

533. I believe you have published a work on the subject of chemical analysis?—Yes.

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534. What are the articles which have chiefly come under your notice in the course of your practice?—A very great many indeed; in fact I published in the book which has been referred to, the result of about 10 years' investigation; I have examined bread, flour, tea and coffee, milk, cocoa, gin, and a host of substances.

535. Have you examined bread and flour to any extent?—To a very considerable extent.

536. Will you be good enough to state to the Committee the results of your investigations?—The adulterations of bread and flour are very much the same, and they consist principally in the introduction of alum; alum seems to be almost the exclusive adulteration of bread and flour; the introduction of alum is sometimes considerable; I have actually seen in bread alum which had been so badly and carelessly mixed as to be found in crystals of the size of a large pea; in the bread of a baker in the Church-road I found alum actually in the state of large crystals of alum; I went to him, and showed him his bread, and he said "I cannot help it:" I said "Are you not afraid of being prosecuted?" and he used a very offensive expression about my eyes, and I of course at once left his shop.

537. What is the object of the use of alum in bread?—The object is this; it has the curious property of imparting to bread made of flour of second or third-rate quality a whiteness which otherwise you could not obtain except in bread of the first quality; besides this, and it is much more important to the baker, it enables him to force into his bread a larger quantity of water than he could otherwise do; the alum imparts to bread the property of retaining that water, after it is taken from the oven. I find that the amount of alum varies from 500 grains, which I had found in the case of which I was speaking, to 250 grains in the 4lb. loaf of bread; frequently 25 to 30 grains in the 1lb.; and more frequently still considerably smaller quantities than that; these, except the last, are rather extreme cases, and generally it does not amount to more than two or three grains per 1,000 grains; I may say that, so far as I know, there is not a single baker in London who makes bread without alum. I once thought I had found that Phœnix of a baker; one who did not use alum; he was an old gentleman, who, however, died lately; and as I went to reside in the neighbourhood about four years ago I re-examined the bread sold at the same shop, and I found alum in it; I thought it was due to him to inform him that his bread, which I had formerly analysed, and in which I had not found alum, now contained it; and his answer was, "If Dr. Normandy does not like my bread, why does he purchase it?"

538. Then this adulteration has a double object; first, it enables the baker to make his bread appear of a better quality than it really is; and in the next place, he defrauds the customer by selling water at the price of bread?—Precisely.

539. Mr. *Kinnaird.*] In the case of the larger quantity which you describe, would that be injurious to health?—Decidedly so.

540. Even with the smaller quantity are there not persons of enfeebled digestive powers who would suffer from it?—Unquestionably there are.

541. It is an astringent?—It is; and we must take into consideration in all matters of that kind, not so much the actual quantity of adulteration which is contained in the bread, but the repeated and continuous doses which are taken day after day, so that eventually a disordered and dyspeptic condition of the stomach is the consequence. The poor man, particularly, who does not buy the best bread, but the second quality of bread, instead of finding in it the nourishment which he pays for, gets, on the contrary, an enfeebled power of digestion, and consequently an inferior power of performing work, a debased condition of health; and he becomes doubtless, to a certain extent, through that cause, and not only through that cause, but also through the adulterations of other food, permanently enfeebled.

542. Mr. *Knight.*] To children, I apprehend, the mischief is still greater than to adults?—Decidedly; I find also that boiled rice is occasionally used in bread; I took some trouble last year to examine a patent which was brought out at the Marylebone Workhouse for making bread, and I found that it consisted in simply introducing into bread a large quantity of boiled rice; not that rice is not a wholesome food, but the effect was to introduce into the bread an enormous, in fact, an incredible quantity of water; so that, if the bread had been

sold

sold at the baker's, he would have realised a large profit by selling water instead of bread.

543. Mr. *Sheridan.*] Is alum used in the bread which is made in France?—According to the process of manufacturing bread in France it is exceedingly difficult to commit frauds. When bread is adulterated in France, which occasionally is the case, the baker, if found out, is I believe at once summoned before the police correctional; if it is the first offence he is fined, or if the offence has been very gross his shop is shut up for a week or ten days, or something of that kind; and if the offence is repeated he is prevented from establishing himself again as a master baker; he can work as a journeyman baker, but he can no longer establish himself as a master baker, and the sentence is placarded about the town; in fact he is a ruined man.

544. Mr. *Wise.*] In France there is an assize of bread, is not there?—Yes.

545. No man can be a baker without permission?—I think not, and also without depositing in the public granaries a certain number of sacks of flour, which he is obliged to keep there. That was a regulation established, I believe, at the time of the great revolution.

546. Mr. *Kinnaird.*] Should you say that the laws in operation in France have the effect of checking the adulteration of bread?—In respect of bread I believe they have; of course there are people who, notwithstanding those restrictions, will commit frauds, but they are generally very soon detected, and I believe, practically speaking, bread is not adulterated in France.

547. *Chairman.*] It certainly is not nearly so much as it is in this country?—Certainly not.—In 1847 I found in three samples of bread which I examined in London, some carbonate of magnesia.

548. Lord *C. Hamilton.*] What was the object of that adulteration?—I believe it was to gain weight.

549. Is that an absorbent of moisture?—To some extent, like all powders. I believe also it may have been used to correct the acidity of flour which may have been damaged.

550. It could not have been merely to supply the place of flour?—I should say not. In 1847 I also found chalk in one sample of bread. I never found plaster; clay I found once. This clay must have been put in evidently for the sake of weight, for it has no power of counteracting acidity.

551. Were your investigations confined to London?—They were. Potato starch I never found in bread. I may perhaps be permitted to say, in respect to potato starch, that though I did not find potato starch in bread, I know that potato pulp is used in bread-making, and owing to this a few potato granules are occasionally detected under the microscope. When you come to examine bread in this way, however, the starch granules have quite a different character, because the starch having been exposed to the heat of the oven, the granules have burst, and the ordinary character, the peculiar oyster shell form, of potato starch is completely obliterated. You may see that a few torn granules are here and there present. I believe that mashed potatoes previously boiled are not introduced for the sake of adulteration. When a baker makes bread he takes a certain quantity of yeast and of flour, and a certain quantity of mashed potatoes, and I believe potatoes are introduced merely as an adjunct to increase the quantity of yeast, so to speak, but that quantity is so exceedingly small that I am sure it cannot be looked on in the light of an adulteration, and it is not injurious.

552. Mr. *Wise.*] You are not surprised that in private houses such a practice should be adopted?—Not at all. If instead of mashed potato, however, potato starch is used, a loaf is obtained which is perfectly unpalatable; it has an earthy disagreeable flavour. I am sure that potato starch could not be used in the process. I have requested a very intelligent baker to make bread for me with various per-centages of potato starch, which I directed him to use. If two or three per cent. of potato starch are introduced, you obtain an ill-shaped, ill-looking bread, a loaf which nobody would like to buy, and it has, besides, that peculiar earthy flavour which potato starch evolves when water is poured upon it.

553. *Chairman.*] Are you aware whether there is any article used in the manufacture of bread which is sold by druggists, and called bakers' stuff?—That is alum mixed with salt. Bakers' stuff, or bakers' salt as it is called, is really nothing else but salt mixed with alum, and sometimes you may consider it alum mixed with salt, the proportion of alum being more considerable than that of salt. Sulphate of copper has been said to be used in bread, but I never found it

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in bread in this country. I am aware that it has been used in Belgium, but I should say that I have examined 150 samples of bread taken from various parts of the Metropolis, and I never found any copper in the bread.

554. Mr. *Kinnaird.*] Have you found, in making those experiments as to bread, the microscope a most useful means of arriving at the knowledge of adulteration?—For the detection of alum, the microscope is of no use; it is a very excellent instrument as a means of analysis, but it will not effect everything; it is, as it were, an adjunct. There are certain substances which chemistry would altogether fail in detecting, which the microscope enables you to detect with certainty; but there are many substances for the detection of which the microscope is useless, but which a chemical analysis will detect with the greatest accuracy.

555. *Chairman.*] Has your attention been directed to the use of German yeast in the manufacture of bread?—It has not.

556. It has been stated that German yeast is imported into this country in a very bad condition, and that if bread be made of it, it is liable to produce diseases of a peculiar character?—I am not sufficiently informed on the subject to speak with any confidence.

557. Mr. *Swift.*] Have you analysed flour not made into bread?—Yes.

558. What has been the result of your discoveries?—I have found in it alum and water. Water exists in flour, but it is not put there on purpose; the millers, or those who grind the flour, on the contrary, strive to prevent water from getting into their flour, because it is then liable to clot or cake together, and shortly afterwards a fermentation is set up, in consequence of which the gluten is destroyed; the flour acquires a musty odour, and it is altogether spoilt. Therefore, when any tendency is observed in the flour to attain this condition, the sacks are immediately rolled on the floor, and spread, so as to break all those clots. It would be a serious loss to the miller or flour-dealer if water should get into his flour; yet, nevertheless, we find sometimes in flour large quantities of water. If the flour is put into a damp place it will absorb from 14 to 18 per cent. of water. It is not, however, an adulteration, because an adulteration presupposes that a man is intending to use it as a means of fraud for a particular purpose, whereas the flour becomes damaged in spite of his endeavours to prevent it; but then when, in spite of such endeavours, any damage of that kind has taken place, he remedies it by adding alum to it.

559. *Chairman.*] Is it your opinion, that the chief adulteration of bread takes place when it is in the shape of flour before it reaches the baker, or does it take place after it has reached the hands of the baker?—I believe it takes place in both places sometimes, first at one place and again at the other, so that there is a double adulteration; the miller frequently adulterates his flour with alum, and the baker again adulterates it by putting a little more into it, so that the flour, as it comes from the baker, is liable to be subjected to a second adulteration.

560. Mr. *Knight.*] The presence of alum is more or less the consequence of the baker's adulteration, is not it?—Yes; and yet, in all the flour I have examined from the corn-chandlers, I have rarely found a flour which did not contain alum to some extent.

561. Mr. *Swift.*] Have you found any specimens of unadulterated flour?—I have occasionally done so.

562. *Chairman.*] Did you obtain the samples which you practised on from the ordinary shops?—Yes; I have generally examined that which was purchased at low shops in preference to the better shops, my endeavour being to find out how the poor were treated in this respect, knowing perfectly well that the rich are less liable to be imposed upon. In the first place, they have more refined habits; they are in the habit of consuming superior descriptions of food, and are therefore more able to detect from the taste that the article which has been adulterated is not that which they are accustomed to eat or to drink.

563. Did you procure the specimens of flour which you found unadulterated from the poorer neighbourhoods of the Metropolis?—Never; flour is always adulterated in the poorer class of shops, and bread, even in the highest quarters, is always adulterated.

564. If not made into bread, flour is not adulterated in those superior shops?—Occasionally it is not adulterated, but in the shape of bread it is always adulterated; I never found a sample of bread without alum, with the single exception before alluded to.

565. Mr. *Kinnaird.*] The alum, you say, gives it a white colour?—I do not wish to be understood to say that, alum being white, the bread is rendered white by the admixture; but that alum has the property of whitening flour when made into bread; you obtain a paste which, when baked, has all the appearance of bread made of better flour than it is.

566. Mr. *Wise.*] It gives to inferior bread the appearance of the best bread?—It does.

567. Have you ever discovered the meal of beans and peas in flour?—In 1847 and 1848 I did so; I believe those years were years of scarcity, but I hardly think that it would be right to look at that as a general practice; it is an exceptional adulteration.

568. Can you suggest any popular mode of discovering the adulteration of flour?—I do not know any popular way of doing so, but the detection of alum in bread is exceedingly easy; you have only to soak the flour or bread, crumbled into powder, in water, squeeze it through a coarse piece of muslin, add a little muriatic acid to it, filter it, and if the filtrate previously boiled yields a precipitate when tested with carbonate of ammonia, it is alumina, which falls down; if, when tested with chloride of barium, there is a precipitate, it is a sign of the presence of sulphuric acid; you have thus two constituents of alum; by the first filtrate with carbonate of ammonia, you obtain a precipitate of alumina; if you obtain with chloride of barium a precipitate, there is an indication of sulphuric acid, and it thus becomes evident that alum is in the bread.

569. Is there not a more simple mode than that, for an ordinary person to practise?—I do not think there is.

570. If there were chemical inspectors in all our great towns, do not you think people would be very much protected by being enabled to go to them and say, "Here we have some flour which we think is adulterated; will you be good enough to analyse it for us"?—I have no doubt of it. I consider that if in the various districts or parishes there were inspectors, men of acknowledged probity and capacity, appointed to receive complaints, the public would be immensely benefited. I am sure among chemists there are plenty of men of character and probity who would be glad to do it as a matter of public duty.

571. If there could be a public prosecutor for adulterations, who could have the assistance of a chemical inspector, to whom flour, bread, and other articles of food could be taken by the public, and penalties could be inflicted, as under 6 & 7 Will 4, c. 37 (of which I once availed myself when some poor people complained of their flour; it was analysed, and plaster of Paris being found, the miller was fined 100 *l.*); do you not think such an arrangement would be an advantage and protection to the public?—It would be a most useful means of detection. I have no doubt that bread is sometimes adulterated with plaster, but I never found that substance in bread.

572. Mr. *Gregson.*] If a loaf of bread were taken to any ordinary chemist, could he detect the adulteration?—I think ordinary chemists know nothing about chemistry; there is nothing so common in England as the name of chemist, and there is really almost nothing so rare as a chemist.

573. *Chairman.*] They are rather sellers of drugs than chemists?—Just so; many of them have not the slightest knowledge of chemistry.

574. Have you turned your attention to the adulteration of tea?—I have. The principal adulterations I have found in tea I will state, omitting all reference to those which I have not myself discovered. I have found in tea, occasionally, magnesia and Prussian blue, and silicate of magnesia.

575. Is that in black tea?—In green tea. This I know to be the case, not only because I have found it, but also because I have seen it put into the tea. A large tea dealer (and it is surprising to see how some of the most respectable men will sometimes do that which is not right), met me one day in Fenchurch-street, and he said, "Doctor, I want you to come and see what beautiful seams the lead of tea chests are closed with." The tea chest as it comes from the warehouse is closed, and there is only a hole, about the size of the hand, cut into the metallic sheet inside the chest, for the purpose of taking out a sample. He accordingly showed me how beautifully and cleverly the metallic sheets in which the tea is packed are soldered together. It should be known that the seemingly unbroken appearance of the sheet of metal in which the tea is tightly packed is no criterion of its not having been tampered with. Through the hole which is made in the metallic sheet for the purpose of taking sample, the whole of its contents are emptied on a clean floor, and the tea is then mixed with whatever

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composition it may be thought fit to add, and worked up with teas of an inferior quality, or which by themselves would be unsaleable. I saw there a room, which which was perfectly clean, boarded with very clean boards, and there were heaps of teas piled up against the wall; there was a rope against the wall, which served the following purpose. The mixture of teas and of magnesia being made on the floor as just said, then the question comes, how the same quantity can be re-introduced into the original chest from which it was taken; and it is done in this way: a small quantity of tea is put in the chest; a man puts his foot within the chest through the hole, grasps the rope against the wall to steady himself, and by a series of jerks he succeeds in packing it up tight, and so he goes on with another layer, and the pounding process is repeated till the chest is eventually filled up as tight as if it had not been touched. This I know from personal observation.

576. Mr. *Gregson.*] Was this an isolated case, or is it a general practice?—I understood from him that all tea-dealers do it.

577. Mr. *Wise.*] So that a man who buys a chest of tea is under a great delusion if he thinks he is secure from fraud?—Quite so. A man who buys a chest of tea from a wholesale tea-dealer runs at any rate a great risk that his tea has been actually tampered with. What induces me to think that the practice is pretty general is, that I know of another dealer whose servant was turned away in consequence of his having been guilty of a petty theft to his prejudice, and it was about some magnesia which he had bought and had not paid for, or something of that kind. Besides that, I should say I have very frequently found, from actual examination, magnesia and Prussian blue in tea.

578. *Chairman.*] What is the object of mixing magnesia with it?—The Prussian blue was to give it a blue tint, and the fine Venetian talc, or the magnesia, to give a glossy appearance to the tea.

579. Besides this adulteration, are there not adulterations practised in China itself?—I am not aware of it. I should say 500 grains of tea would yield 27 grains of ashes by incineration. There is an article which of late years has also been sold for adulterating tea, and that is the article called veno beno. I find that this article consists of 90 per cent. of catechu.

580. Mr. *Gregson.*] What is catechu?—It is a vegetable extract, known also under the name of terra japonica; it is used by tanners. The remaining 10 per cent., or thereabouts, appeared to me to be tea-powder. On examination under the microscope I found the appearance of broken tea-leaves. I am aware that other chemists who have examined this adulteration after me have supposed that these vegetable powders consisted of other leaves, such as sloe-leaves, but I am myself satisfied that what I examined were broken tea-leaves; tea-powder, in fact.

581. Is there any simple mode by which the consumer can detect this adulteration?—I do not think there is.

582. *Chairman.*] Is veno beno extensively used?—I have not seen it used lately.

583. Mr. *Swift.*] Do you still prosecute your endeavours to detect adulterations?—Yes; when an author publishes a book, he looks, of course, to the possibility of a second edition.

584. Mr. *Gregson.*] The cost of these ingredients, compared with the cost of tea, is very small, is not it?—Very much so.

585. *Chairman.*] Would you consider this veno beno to be deleterious?—No, it is merely an astringent substance, and is not otherwise objectionable than as being an astringent substance used for a fraudulent purpose.

586. Mr. *Kinnaird.*] Do you think the adulteration takes place by the whole sale dealer or the retail dealer?—In respect of the Prussian blue and magnesia, I am satisfied it is done by the wholesale tea-dealer. I know from personal experience that adulteration was practised by several wholesale tea-dealers in this country.

587. Mr. *Swift.*] Do you think any other adulteration is practised by the retail dealer after he receives the tea into his hands?—I do not know. It is a fact that tea is adulterated by the wholesale dealer, and it is possible that it is further adulterated by the retailer. Adulterated teas are found in the hands of both, but whether the adulteration lies at the door of the wholesale trader exclusively, I know not.

588. *Chairman.*] Have you any other facts connected with tea which you wish to mention?—I have not.

Veneris, 20° *die Julii*, 1855.

MEMBERS PRESENT:

Mr. Scholefield.	Viscount Goderich.
Mr. Wise.	Mr. Villiers.
Viscount Ebrington.	Mr. Kinnaird.
Lord Claud Hamilton.	

WILLIAM SCHOLEFIELD, Esq., IN THE CHAIR.

Alphonse Normandy, Esq., M. D., called in; and further Examined.

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589. *Chairman.*] HAVE you any explanation you wish to make of your previous evidence?—I would beg leave to explain a statement which I made my last examination, which I fear may have been misunderstood. I said that from 250 to 500 grains of alum are sometimes found in a quartern loaf; and this is perfectly true, but instead of those proportions being, as it would appear, a usual quantity, the cases which I mentioned were extreme cases. I omitted also to call the attention of the Committee to a certain description of bread which goes by the name of unfermented bread, which is made by mixing flour with a certain quantity of diluted muriatic acid, and another portion of flour with a certain quantity of bicarbonate of soda, in such proportions that the one will neutralise the other; the result being the production of common salt. This cannot be looked upon in the light of an adulteration, but there is considerable danger attending the manufacture of bread in that way notwithstanding. There is on record a case which terminated fatally from a person having used such bread. The danger is owing to this: muriatic acid generally contains arsenic; it is, in fact, the most frequent impurity in muriatic acid; the consequence is, that if bread be raised artificially by muriatic acid, the quantity of arsenic which was contained originally as an impurity in the muriatic acid will be transferred to the bread, and I need not allude further to the consequence of that practice.

590. Is all unfermented bread made with muriatic acid and bicarbonate of soda?—Occasionally the muriatic acid has been replaced by tartaric acid; but muriatic acid is the common mode adopted; and I should further say, that whatever mode may be applied we should deprecate the introduction of chemical re-agents at all times into articles of food; for this reason, that chemical substances are very seldom pure, and that being the case, I conceive they should never be permitted to be introduced or used with articles of food.

591. Your opinion is that the use of muriatic acid and carbonate of soda in this manner is injurious?—It is; and moreover it makes a bread which is deficient in a great many qualities; it will not make a poultice; it will not toast, and as it is perfectly inabsorbent, it is indigestible, notwithstanding what has been said by some medical practitioners, who are not quite conversant, perhaps, with the subject.

592. Mr. *Villiers.*] What is the object of putting that muriatic acid and carbonate of soda into bread?—If vinegar be poured upon chalk there is a bubbling and boiling produced. Any acid poured upon a carbonate will produce the same bubbling. If, therefore, the bicarbonate of soda, which contains a large quantity of carbonic acid, be mixed with bread, and muriatic acid be poured upon it, an effervescence will take place which will raise the bread and dispense with the use of yeast. Bread made in this way is called upon that account unfermented bread. It was supposed that the bread would be more nutritious, because the sugar of the flour was left in, that is to say, it was not, as in ordinary fermentation, converted into carbonic acid; that acid is one of the products of fermentation of the sugar in flour, after its admixture with yeast; that acid, in escaping through the dough, converts it into a spongy mass, which is raised dough, and subsequently converted into bread by baking.

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593. Does it save anything in point of cost?—No; I only wish to allude to it, not as an adulteration, but as a dangerous practice.

594. Lord *C. Hamilton.*] It is always sold and advertised as unfermented bread, is not it?—Quite so.

595. *Chairman.*] It is not commonly used, is it?—No, it is not; still I see it sometimes advertised for sale in the windows of some bakers.

596. Have you any remarks to make upon the subject of the adulteration of cocoa?—Cocoa and chocolate, I believe, are articles of food which are more adulterated than any. Chocolate, which should be a mixture of sugar and *fecula*, or arrowroot, is frequently mixed with brick dust. Sometimes I have found as much as 12 per cent. of ochre. I have found 22 per cent. of peroxide of iron; it is very frequently adulterated with animal fats, and those often of the very worst description; rancid tallow, for example; if the fat be separately collected and examined, you will see it has all the characters of the very worst descriptions of fat.

597. Is it at all necessary to mix anything with the cocoa and sugar, in order to give it consistency?—Not at all. Cocoa ground *per se* in hot mills or on hot plates, will, on solidifying, form a perfectly hard mass; but then pure cocoa contains a somewhat solid oil which is called butter of cocoa, which does not agree very well with some persons, while if it be combined with a certain portion of arrowroot, it is more easily digested. This butter of cocoa, however, is occasionally and frequently extracted from the cocoa for the purpose of obtaining separately, as it is used as a medical preparation, and then in order to replace it in the chocolate, tallow is used.

598. Mr. *Villiers.*] Can it be worth while to adulterate cocoa, which is so cheap?—It is so cheap precisely because it is adulterated.

599. It is much cheaper of late years, because the duty has been taken off?—It is cheaper from both causes. The last samples I examined were purchased about 18 months ago.

600. Mr. *Wise.*] The adulterations are principally practised upon the preparations of cocoa, are not they?—Yes, either cocoa powder or chocolate; I examined some cocoa powder a few months ago, which I found adulterated to a very great extent. The cocoa nibs are not adulterated, but very frequently the nibs are interspersed or mixed up with nibs of musty cocoa; one does not exactly detect the admixture till it is ground and hot water is poured upon it; then a musty odour comes up, which is sometimes offensive.

601. Mr. *Villiers.*] That is a fraud?—Decidedly, and so is brick dust, and tallow, and peroxide of iron, and ground shell, and ground biscuit.

602. Have you found these things in cocoa?—Yes, I have found them myself. In this evidence I say nothing from mere hearsay; I speak only of what I have found myself.

603. Have you made frequent experiments?—Very frequent; cocoa and bread are the articles I have most extensively examined. I am under the mark in saying that I have examined at least 150 samples of bread, and cocoa to the same extent.

604. How do you arrive at the existence of those ingredients in cocoa, is it by the microscope?—You may detect ground shells by the microscope, but the others are detected by burning a quantity of the cocoa, and examining the residue by treating the cocoa with ether and so forth.

605. Do you know the particulars of this adulteration, that is to say, where it takes place; is it by the wholesale dealer?—I have reason to know that it is done by the manufacturer of chocolate: I do not conceive that it could be done in any other place but by the chocolate maker.

606. In what state does the chocolate come to this country?—It does not come to this country in the shape of chocolate; it comes in the shape of cocoa nuts; those are sold to the chocolate maker, and he makes his own mixture.

607. That is how we import cocoa, is it; we import it in the nut, do we?—Yes; then the chocolate makers crush the cocoa, shell it, fan the shells away, and grind the cocoa with sugar and flour, and so on.

608. Is there not a good deal of chocolate imported from Spain and France?—There must be some, but I am not aware that it is to any great extent.

609. *Chairman.*] Have you examined any foreign chocolate?—No.

610. Lord *C. Hamilton.*] Do not they send chocolate from South America made up?—I am not aware that it is imported made up; it may be so.

611. Have

611. Have you ever met with red lead in chocolate?—No, I have not found it; I know that has been stated, and, indeed, the statement will be found in all books which treat of the adulteration of food, but I have not found red lead in chocolate nor in cocoa powder.

612. Mr. *Villiers.*] When did you first begin to make your enquiries about cocoa?—About 10 or 12 years ago.

613. Are you aware that it has increased as an article of consumption very much within the last 10 years?—Immensely.

614. Have you ever made a calculation what is the profit upon the adulteration, taking the value of the adulterated article, and comparing it with the value of the pure article?—No; I have done it in the case of coffee, but not in the case of cocoa.

615. *Chairman.*] Some of the articles used for adulteration, such as red ochre, could be of little or no value?—They are of no value, comparatively speaking.

616. Mr. *Wise.*] If I understand your evidence correctly, you are of opinion that the only security for the public in the case of cocoa is that they should use the cocoa nib?—Certainly.

617. All those preparations of chocolate, or paste, or powder, are more or less adulterated?—Yes, generally; there is no question about it; cocoa nibs would be used more generally, but unfortunately the cocoa nibs will not boil tender; they must be stewed a very long time, indeed; while a cup of chocolate may be at once prepared, and when properly made, is one of the most delicious and most nourishing beverages you can have; it contains everything that will sustain life and repair waste. It is a perfect food.

618. As made in Spain and Italy, it is a delicious beverage?—It is, indeed.

619. Viscount *Goderich.*] Could you make a cup of chocolate from the cocoa nibs?—No; you would obtain a rather watery liquor, exceedingly pleasant to the taste, but not very nourishing, because it is only a very trifling quantity which will have dissolved, so that it is rather a drink than a food in that condition.

620. It would not be what we call chocolate?—No; chocolate must be a mixture of arrowroot and sugar, and then boiling it for a few minutes will make a palatable and refreshing beverage.

621. Viscount *Ebrington.*] If the cocoa nib be crushed and stewed 24 hours over a slow fire, do not you think it is a very nourishing food?—Yes, but that gives a great deal of trouble. In fact it is that very trouble which the chocolate-maker professes to spare you, at least he should do so if he were an honest dealer; he crushes it for you, and sugars it for you, and mixes it with a little arrowroot in order that the butter of cocoa should not prove indigestible or disagree with you; he takes all the trouble which you must take if you use the cocoa nib.

622. Mr. *Villiers.*] You say those preparations are very general; have you taken samples promiscuously from different shops, large and small?—Yes.

623. You are of opinion decidedly, that the adulteration takes place with the manufacturer?—Decidedly.

624. Do you conclude from that, that the retail dealer is imposed upon?—Yes, I conclude that, because it is generally sold in packets which bear evidence of not having been opened; they are sold as they come from the manufacturers.

625. You have no evidence that the retail dealer pays less for the adulterated article than he would for the other?—No. I have no evidence that the retailer tampers with it; and in order to suppose so, I must suppose that he has been guilty of a felony as well in imitating the labels, name, and marks of the manufacturer.

626. Do you generally find the same proportion of adulterating matter in those packets?—Yes, generally so when they come from the same maker.

627. *Chairman.*] The peroxide of iron, I presume, would be injurious to some constitutions?—Injurious as a brickbat would.

628. Would not it have any direct chemical effect?—No, it is a perfectly inert insoluble substance.

629. Lord *C. Hamilton.*] Does the purchaser get nearly the value of his money in the article he buys?—No.

630. Adulterated as it is he ought to get it much cheaper?—Yes, decidedly.

631. Therefore there is a great fraud in the adulteration?—In every way there is a great fraud.

632. Mr. *Wise.*] In your examination of cocoa nibs have you ever met with old biscuits or crushed acorns?—Yes, old crusts or old bread I have found; I believe

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believe they were biscuits, but I have no means of speaking positively as to that fact, so that I say it was some farina baked very hard; it may have been crust of bread or something of the kind; I believe they were old biscuits.

633. Have you no reason to believe that acorns are collected and crushed, to any extent?—I have heard of it, but I have no personal proof of it.

634. *Chairman.*] We will now go, if you please, to the article of coffee; will you give us the result of your investigations into the adulteration of coffee?—Coffee is an article which is very much adulterated.

635. Will you put aside its adulteration with chicory; what other adulterations have you noticed in coffee?—I have met with roasted corn; I have found roasted corn to an extent of from 25 to 30 per cent.; it is recognized by the size and character of the starch granules.

636. Mr. *Villiers.*] What is the roasted corn; what grain is it?—It consists of barley rye, and it is generally very easy to detect as roasted grain; it floats up; if coffee has been adulterated with roasted grain, when boiling water is poured upon it you will see raising against the sides of the cup portions of the ground grain, which sometimes can be separated in considerable quantities; by capillary attraction, the ground seeds climb up along the sides of the cup; if you pour such coffee from the coffee pot, some of those grains will fall with the liquid in the cup, and they will climb up (as it were) the sides of the cup, a quarter of an inch or so all round, and you can collect them very readily. The other adulteration of coffee is chicory and parsnips or carrots, I hardly know which, for they present very much the same characters.

637. Are they largely used?—Parsnips and carrots, under the microscope, present very much the same appearance as chicory. I have found from 50 to 75 per cent. of chicory, or thereabouts. I made a little calculation in this way: "It is a well-known fact, that at the present time (that is, 1850) the average cost price of coffee, including duty and roasting, is 1 *s.* 2 *d.* per pound, and yet we see it marked up for sale in a great number of shops at 1 *s.* What a bargain! But how does this come about? Simply this: half a pound of coffee at 1 *s.* 2 *d.* per pound, 7 *d.*, half a pound of chicory at 4 *d.* per pound, 2 *d.*; the grocer's profit, 3 *d.*; making one pound of adulterated coffee, 1 *s.* The purchaser has therefore paid 1 *s.* for seven pennyworth of coffee."

638. Mr. *Villiers.*] He has only seven pennyworth of coffee, for which he has paid 1 *s.*?—Quite so.

639. *Chairman.*] What do you conceive to be the comparative price of chicory and coffee?—Chicory is between 2 *d.* or 3 *d.* and 4 *d.* a pound; you cannot get coffee, which is worth the name, for less than 1 *s.*; then there is the grinding, which is 2 *d.*; so that a pound of coffee cannot be produced for less than 1 *s.* 2 *d.*, exclusive of the grocer's profit. Therefore, if coffee is marked up at 1 *s.* a pound, it is very clear something extraordinary must have taken place to enable the grocer to sell it at that price.

640. You are aware that many persons like the admixture of chicory in coffee?—I know that some do; I do not.

641. Do you know that it is commonly used in France?—It is extensively used in France, but it is never sold as a mixture; of course, I speak generally, and not of isolated cases; I do not think the mixture is permitted by law to be kept. I understand that the customer or purchaser is frequently defrauded by a sort of legerdemain; while the whole coffee is being apparently ground before him, by a sleight of hand the grocer puts a little chicory in the mill, and grinds them up together.

642. Mr. *Villiers.*] You have no doubt that the fraud is extensively practised in France, of supplying chicory instead of coffee?—I know that it is so, and I know that it is liked, especially by the lower orders, to drink with milk; but as to its being preferred for what is called coffee alone, it is a perfect mistake. I am certain no respectable coffee-house would get a customer if they sold *café noir* with chicory in it, because chicory gives a peculiar taste to the coffee, a sort of liquorice-like taste, which disappears when mixed with milk, and it gives to milk a more golden colour than coffee alone.

643. Do you think any Frenchman can detect when there is chicory in the coffee without milk?—I do.

644. Do you think if you stopped anywhere on the road, and asked for a cup of coffee in France, you would have the smallest chance of getting it pure?—In a good

a good house you would do so; the great secret in making good coffee is, to take good coffee, and to put enough of it.

645. There is the same object there as there is here of producing an adulterated article, and charging for the pure article?—Every person in France is in the habit of drinking coffee in large quantities; and the taste of the black coffee unadulterated with chicory is so different from coffee which is adulterated with chicory, that I am satisfied that a house which would attempt to sell cups of coffee containing chicory would lose its custom.

646. Are there not other things for adulterating coffee with in France?—I have no evidence on the subject. My evidence is confined to this country, where I have lived upwards of 20 years. I have investigated the coffee sold in London, but what is sold in France I am not prepared to give evidence on.

647. You very seldom get pure coffee here at any hotel, do you?—You always get it exceedingly weak.

648. Lord *C. Hamilton.*] Is not it the case that it is much less usual in France to buy coffee roasted and ground; do not all persons roast their own coffee?—Yes, and the retailers roast every day the quantity of coffee they are likely to require during the day. It is a great mistake to keep coffee roasted or ground in large quantities.

649. It is the case that there is not the same facility for fraud in France as there is here; the practice of this country being to buy coffee already ground and roasted, whereas they generally buy it and roast it themselves, or buy the roasted bean recently roasted, and grind it at home?—Yes, or else it is ground before them by the grocer.

650. Therefore the facilities for fraud are not the same in France owing to the different usage of the people?—Just so.

651. *Chairman.*] What is the medicinal property of chicory?—It has no property at all; I know that it is a slight demulcent; it has the medicinal property, you may say, of mucilage of linseed, but owing to a very small quantity of bitter extraction it has besides a very slight tonic action.

652. Would you consider it injurious in itself?—No.

653. It is simply a fraud upon the public by being sold at the price of coffee?—That is all.

654. What is the largest quantity of chicory you have detected in coffee?—Seventy-five per cent.

655. What would you consider is the common amount of adulteration?—It ranges from 20 up to 75 per cent.

656. Mr. *Villiers.*] Under what circumstances do you find it to the extent of 75 per cent?—It is generally sold in canisters in that state; it is extraordinary how such stuff can be bought except by persons who know nothing about coffee, for the very smell is sufficient to show that such coffee contains chicory to a considerable extent; in fact, the chicory quite overpowers the odour of the coffee; it has a peculiar odour which I cannot very well describe.

657. Is it in the small shops or the larger ones that you have found this adulterated coffee?—In very large shops I have found it.

658. Have you examined any samples from the small towns or country villages?—No. The coffee containing 75 per cent. of chicory was bought in one of the largest shops in the suburbs of London, somewhere about the Kingsland Road; a very large, and one would think a highly respectable shop.

659. Doing an immense business?—Yes; they were selling ground coffee in canisters, and I found at least 75 per cent. of chicory in it. It colours water most intensely, for that is one of the ways of detecting the quantity. It is by the colour a given weight imparts to tubes of glass filled with water, and by comparing it with the colour of known mixtures, you ascertain the extent of adulteration. The microscope enables the operator also to arrive at a very good quantitative result.

660. Did you make any enquiries at the place where you got that particular kind of coffee?—They mix it themselves. When I was beginning these investigations I was foolish enough to go to the parties occasionally, and tell them, "Really, this is very bad," but generally they abused me, and therefore I gave up the remonstrance. They began to use offensive language.

661. They were, perhaps, aware of what you told them?—There is no doubt of it. I went to this person in the Kingsland Road; I said, "This is too bad; you are putting an enormous quantity of chicory in your coffee," and he said, "What

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"What is that to you," and began to speak offensively, and I left. I told him he was liable to a prosecution; that I was not an informer, however, and that he had nothing to fear from me, but if an Excise officer were to ascertain the fact he might be prosecuted.

662. When was this case?—About five years ago.

663. *Chairman.*] Have you examined coffees recently?—Quite recently.

664. Is chicory sold separately by the same parties who sell coffee?—I believe it is; I have bought chicory separately at the same shop where I have obtained this mixture.

665. You are aware that they are now allowed to sell a mixture of chicory and coffee?—So I understand, unfortunately.

666. That you think objectionable?—I think it is very objectionable.

667. They do not state the proportion on the label they put outside, do they?—No.

668. So that you might have a teaspoonful of coffee, and all the rest chicory?—Yes, that was the case with the specimen I have mentioned, but that was sold under the name of coffee, and not as a mixture. It was sold, if I recollect right, under the title of "Coffee as in France."

669. Lord *C. Hamilton.*] Supposing the chicory is very good and there is no harm in it, is its property in the slightest degree improved by the process of charring or roasting?—Unless it be roasted it is not applicable to the purpose; if it were not roasted it would yield a mucilage something like linseed; a sort of ropy liquid.

670. Can roasting be said to improve its quality, supposing it is a useful article?—It is a softish sort of root which could not be used unless it were roasted. You may compare it to bread, for example; the soft crumb of the bread could not be very well used for adulteration with coffee, but the crust of it might.

671. Do you consider that chicory itself is injured by being roasted?—It is not injured at all; it loses in this way water, so that instead of yielding, which it would do when not roasted, a mucilage, when boiled with water, it yields a coloured liquid, which is not ropy or mucilaginous, as it otherwise would be.

672. It has been alleged that it enables ground coffee to be kept better; is there any foundation for that?—No, not any; it is perfect nonsense; that is the excuse which the seller alleges, but it is perfectly unfounded.

673. Mr. *Villiers.*] Is there any nutriment in chicory?—Yes.

674. There is none in coffee, is there?—Yes, there is a good deal of nutriment in coffee; coffee and tea contain both the same nitrogenised substance (caffeine, theine, guaranine), capable of being transformed into taurine, which is a nitrogenised compound peculiar to bile. In the present highly civilized state of society coffee and tea are singularly well calculated to supply beverages of an exceedingly useful nature, especially to persons of studious pursuits or of sedentary habits, by contributing to the formation of a substance deeply affecting the vital processes of the system, with which the daily avocations of civilised life sadly interfere, and which the due performance of, these infusions have, on the contrary, a tendency to promote, or any deficiency in which they may to a certain extent make up for; the increasing fondness of civilised nations for tea and coffee finds thus a natural explanation.

675. Lord *C. Hamilton.*] It has a very strong action upon the vital process, has not it?—It has.

676. *Chairman.*] Have you seen any of the labels which are now pasted upon packets of coffee under the new law, and have you noticed the way in which they are marked?—No; I do not recollect having seen anything particular about those labels more than I saw before.

677. The fact that there is a mixture is not very distinctly stated upon the outer cover, is it?—It is so little distinct that I have not perceived it.

678. Mr. *Villiers.*] Is there any ready way of detecting this mixture of chicory and coffee, so that ordinary people could avail themselves of it, or if you had an inspector for the purpose, could he be readily referred to to ascertain if there was that kind of adulteration?—It is so easy, when the proportion is at all large, that you can detect it without even looking at it, merely by taking a pinch of the adulterated coffee and rolling it between your fingers. If it adheres and forms a pellet, there is chicory, because with pure coffee you cannot do so; coffee does not agglutinate; chicory, on the contrary, has a great affinity for water, and will knead into a clammy mass; coffee will not do so; so that, if you take a pinch of pure

coffee ground, and attempt to knead it together, or roll it into a ball, you will not succeed in doing it; but if there is any chicory with it, the moisture of the finger, or if you have a dry hand, if you moisten the fingers with a little saliva, and roll it in this way, you will obtain a pellet which will drop like a small shot.

679. That would not prove what the mixture was, would it; there are other substances which might produce the same effect?—There are other substances, such as clay, for example, that would do so; but chicory has a peculiar odour, and there are besides other circumstances which would show what it was; I am now speaking of an *à priori*, of a preliminary test.

680. In case you wished to impose a penalty, and sought for direct proof, would the evidence of the microscope be sufficient?—The microscope gives perfect evidence of the presence of chicory, or of parsnip, or of carrot; I believe a microscopist, that is to say, a person who has devoted his attention almost exclusively to microscopic examinations, would easily distinguish between parsnip or carrot and chicory, but I cannot very well do so myself; I have only used the microscope as an adjunct to chemical means of investigation; and yet though I do not pretend to any extraordinary skill in the usage of the microscope, the character of chicory is so distinct, and the spiral vessels are so readily observed, that I can at once detect them without the slightest difficulty.

681. If there were public inspectors of food, do you consider they could obtain such proficiency in the detection of this adulteration that they could at once pronounce upon it?—Yes; with a very moderate amount of skill indeed you can at once detect that there is either chicory or parsnips or carrots; the only difficulty is in the detection of parsnip as distinguished from chicory; there is no difficulty in distinguishing chicory from coffee.

682. Did you ever discover any deleterious mixture with coffee?—No, I never found anything deleterious.

683. Lord *C. Hamilton.*] Are you aware that it was stated by a former Chancellor of the Exchequer in the year 1851, that four eminent persons had been employed to report upon this subject, but neither by chemical tests, nor in any other way, was there any certainty whether the mixture contained chicory or not?—I do not know who the eminent persons were, but they must certainly never have looked into a sample of adulterated coffee through the microscope; from merely looking at it you at once see that chicory is present.

684. Do you imagine that that opinion would be indorsed by the generality of chemists in London?—No; no chemist would indorse the opinion that chicory cannot be detected in coffee; but quite the reverse.

685. Viscount *Goderich.*] Do you consider that whole coffee is free from adulteration, generally speaking?—I hardly know what to say to that; it is a question which I have not yet quite decided myself; I have occasionally met lately with whole coffee which appeared to be pure, and which on grinding turned out to be a very singular substance; I cannot give evidence upon that because I do not know how it comes about as yet; but about a month ago I had a sample of that kind which, occasionally, as I have a leisure hour to spare, is now engaging my attention to ascertain what it can consist of.

686. Did you ever hear of any person having invented a machine by which he could compress chicory into the shape of coffee berries?—No, I have not.

687. *Chairman.*] You have no doubt of the fraud in the case of which you speak; there is something sold which has the appearance of the coffee berry which is not coffee?—Yes.

688. Do you consider the adulteration of chicory extensive?—Yes; with a kind of earthy matter, brick dust and ochre.

689. Are parsnip and carrot extensively sold as chicory?—I believe so, but I hardly conceive that there would be a great profit in that, and as I cannot distinguish myself between parsnip and chicory, I am not prepared to give any evidence upon it.

690. Is there any difference in the value?—No, not much; but there would be a great difference in value between chicory and brick dust; chicory is very frequently mixed with earthy matter, and even with charcoal.

691. In large quantities?—In pretty large quantities; I have found 15 per cent.

692. Mr. *Villiers.*] Do you ever find that chicory is consumed alone; do the poor or any portion of the community consume it alone?—I am not aware that they do; I think it could hardly be so consumed; it would yield a very effete and vapid sort of infusion or decoction; by itself it has no aroma.

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693. *Chairman.*] Is it nutritious?—It contains a little starch, a little gum, a little glucose sugar, a little fat, and therefore it is nutritious to a certain extent.

694. Mr. *Villiers.*] We have often heard that beans are mixed with coffee, have you detected that?—The chief adulteration I have found in coffee, except chicory, is roasted corn. I am aware that it has been stated that beans and peas have been used for the purpose, but I have not found any instance of it. I am told, also, that acorns have been used, but I have not myself seen any instance of that.

695. Can you distinguish between the qualities of coffee so as to say whether inferior coffees are mixed with the better kinds?—It is more a question of taste than of chemistry.

696. You have not detected it by any analysis?—You can only detect it by taste if you are well acquainted with the various qualities of coffee.

697. You do not know whether that is practised?—No; there is a good deal of musty coffee ground; coffee which has become musty before grinding, from becoming damp or musty in the hold of the ship; there is a great deal of coffee which, when pounded and mixed with water, has quite a musty taste; that is so frequently the case, that actually a coffee-roaster in this metropolis took out a patent for disinfecting such coffee. The process consists in passing a current of air through the roasting cylinder while the roasting is being carried on. In this way you get rid of the musty flavour which such coffees have; but then the patentee forgot at the time that the same process which deprived the coffee of its musty odour, would also deprive good coffee of its aroma, so that taking good coffee, passing a stream of air through it while roasting, would very materially deteriorate the qualities of that coffee. Another cause of deterioration is this: in England, coffee-roasters are in the habit of emptying the cylinders in which they have roasted the coffee upon large hurdles, or sieves, supported upon an axis; there is a handle at each side, and a man moves it up and down in order to cool the coffee rapidly, but in doing that a great deal of the oil to which coffee owes its flavour is dissipated, and the coffee is materially injured.

698. Lord *C. Hamilton.*] Have you ever met with any tan or oak bark in prepared chicory?—I have not; it is true I did not look for it; therefore it may have been there and I may have missed it.

699. *Chairman.*] Have you examined malt liquors at all?—I have. Beer is a liquid which is very largely adulterated, but I must say, as far as my knowledge goes, not in one single instance by the brewer. The adulteration takes place at the publican's, and to such an extent that there is actually a difference of 50 per cent. sometimes in the quantity of alcohol which the same beer contains when it comes from the brewery and when it is bought from the publican. I am speaking of that with very great certainty, because I have purchased porter from a brewer, and I have purchased the same beer of a publican where the beer is retailed, and I was surprised to find that the quantity of alcohol was so enormously different. The beer is so greatly adulterated, that I always purchase the beer I consume from the brewery, and I have done that for several years past. Lately I was out of beer, and I sent to a public-house for some, but I could not drink it; it was perfectly vapid and nauseously sweet; the substances which can be detected as adulterating substances are only two; namely, common salt, which is used to a much more considerable extent than it should be, but that is probably merely for increasing the thirst of the consumer; and sulphate of iron, by which I once suffered pretty severely. I was at Bermondsey, coming from examining a tanning factory, it was in the heat of summer, and I stepped into a public-house to take a glass of porter, and very soon after I was seized with violent colic and vomiting, and felt exceedingly uncomfortable; I drove home, however, and the symptoms disappeared rapidly. The next day I returned to the same place with a bottle, and bought half a pint of beer at the same public-house, and then I found the presence of sulphate of iron, and I attributed, of course, to the presence of that poison, my indisposition.

700. What is the effect of sulphate of iron on the constitution?—It produces vomiting and colic; mine was a true case of poisoning.

701. It is mixed with beer for the purpose of giving froth and head to it, is it not?—Possibly, and perhaps also for producing a kind of metallic smartness, I presume, which the drinkers of that beverage like. There are many other substances with which beer is adulterated, but unfortunately they cannot be detected by

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by chemical means. I say that they are employed, because I have obtained on this subject evidence which appears to me to be perfectly conclusive. I obtained a letter of introduction to two of the largest druggists in London, and from them I learnt that cocculus indicus, foots sugar, and liquor ammonia, and extract of gentian, were constantly sold by them to publicans for the purpose of adulterating beer. Some years ago I saw, standing at the corner of a street near a public-house, a cart, with the name of some person, "brewers' druggist," painted upon it; I think the inference is, if there be brewers' druggists there must be beer druggers. I have inquired after those parties, but I find that lately they have completely disappeared. There are no longer any druggists, following ostensibly the profession of adulterators of beer; still I find that certain people, generally decayed tradesmen in that line, go round to new public-houses, and sell to the publican a way of sophisticating his beer, or of physicking, when from some damaging cause or other it requires "treatment;" he, the publican, is occasionally willing, at any rate, to buy the secrets of those persons, who, I understand, are very poor, and are glad to sell those secrets for a very small sum. The two persons whom I got the information from did not personally know me, though they might have known me by name. What they told me was perfectly conclusive, because their separate account tallied perfectly; they told me that they sold cocculus indicus to publicans, and that this cocculus indicus was used to replace the spirit which had, so to speak, vanished by dilution with water. Now cocculus indicus is a poisonous substance; a true poison; it contains about two per cent. of the poison called pitrotoxine; it is used constantly, I understand, by poachers for destroying pheasants and fishes. There is no doubt that this poisonous substance is frequently used by brewers for the purpose of causing a species of inebriety which should be due to alcohol.

702. Mr. *Villiers.*] It is not for the purpose of giving a head to the beer, is it?—No, it is an intoxicating substance; it creates a feeling of intoxication without the previous excitement which alcohol produces; it knocks you down, so to speak, without previous exhilaration.

703. Is that state of inebriation more prejudicial which is produced by cocculus indicus than that which is produced by alcohol?—I believe so; for though alcohol produces intoxication, it does not disorganise except when taken in immoderate quantities; it does not act so fatally as poisons would act.

704. When this state of inebriation is over, does it leave any other bad effects behind it?—No, it disappears, and you return to your normal state; but a case of poison generally affects the organs more or less seriously, and moreover we should bear this in mind in investigations of this kind, that it is not so much the quantity as it is the introduction of a small dose every day and every hour, so to speak, of our life; it eventually tells up, and impairs the health very much indeed.

705. *Chairman.*] That would apply still more to sulphate of iron, would not it?—I do not think sulphate of iron is used very extensively. I have not been able to detect its presence more than two or three times.

706. Mr. *Villiers.*] It is for the purpose of supplying strength to the beer?—Yes.

707. And that, I suppose, is wanting from a very considerable supply of water?—It is. For the same reason they add to it a certain quantity of foots sugar, because by diluting the beer they have rendered it less sweet, and therefore a little sugar is added. By the addition of water, not only have they diminished its sweetness, but they have also diminished its colour; and then they put into it a little liquor ammoniæ, or spirits of hartshorn, which has the property of darkening beer, so much so, that if you add a little ammonia to pale ale, it will become the colour of porter. Instead of hops, extract of gentian is used. Gentian is not a deleterious substance; it is introduced merely because the beer has been diluted, and it is no longer so bitter as it should be, and therefore a little extract of gentian is introduced. Indeed, I am given to understand that the chief sale of gentian is to publicans.

708. Viscount *Goderich.*] Is gentian cheaper than hops?—Yes.

709. Mr. *Villiers.*] Have you been able to discover the proportion of water there is in beer at any time?—Yes; the quantity of alcohol is first determined, and consequently the quantity of water may be judged of from the amount of alcohol which is wanting.

710. There is no amount of alcohol which is required; the brewers are not

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bound to sell it at a certain strength, and therefore you have not the means of detecting how short it falls?—No. I or any chemist can ascertain the quantity of water which has been added by determining the quantity of alcohol there should be. If I obtain beer from the brewers, from Messrs. Calvert, for example, I find that beer contains so much alcohol; but I have found only half that amount of alcohol in the beer sold by some publicans who have Messrs. Calvert's name upon their sign-board.

711. Any brewer knows how much his own publican adulterates his beer; he knows the strength of the beer he brews, and he can ascertain the strength of the beer that is sold if he tastes it, or applies any other test?—I think he will take care that he does not taste it.

712. *Chairman.*] You consider the infusion of malt and hops a very wholesome beverage, I presume?—Yes; pure beer is the wine of northern nations; it is an excellent beverage.

713. You consider that those articles, such as cocculus indicus and sulphate of iron, must act very prejudicially upon the system?—There is no question of it; beer, which is really an excellent beverage, is converted in this way into a means of producing disease.

714. Mr. *Villiers.*] How could any poor man know whether his beer was adulterated or not?—I cannot tell; I could not know it myself, except by determining the proportion of alcohol; there is no means of determining the quantity of cocculus indicus added.

715. If brewers were bound to brew beer of a certain strength, that would afford a means of preventing adulteration?—Yes. Some years ago there was a great cry about the introduction of strychnine into beer; at that time my yard was converted into a sort of beer wharehouse from the samples sent to me to ascertain if they were pure. Messrs. Allsopp, and Messrs. Bass, and Messrs. Calvert, Messrs. Moore and others, sent me samples of their beer. I could have detected half a grain of strychnine in a gallon of beer, but the amount of cocculus indicus cannot be determined.

716. Can you detect sulphate of iron?—Very readily; nothing is so easy.

717. Do you know whether the officers of Excise ever detect those adulterations?—They could detect sulphate of iron. I do not know whether they do, but sulphate of iron is very seldom used. You may call that an exceptional case of adulteration.

718. You say that unless you know the amount of alcohol you cannot discover the amount of water which a man is drinking with it?—You cannot. An Excise officer might perform the duty if properly instructed and supplied with an instrument, which has been constructed for the purpose, which tells the quantity of alcohol contained in any mixture by the temperature at which it boils. If you boil a quantity of alcohol and water you find the mercury is rising gradually in the thermometer, and there is a certain point at which the mercury will remain stationary for about half a minute without rising. That is the point which corresponds with the predetermined mixture of alcohol and water. By referring to certain tables constructed for the purpose you can at once ascertain the amount of water present.

719. You see no reason why the Excise officer or some competent authority should not detect this adulteration?—Certainly not.

720. *Chairman.*] Supposing the adulterations you speak of were effectually stopped, you suppose the consumption of malt and hops would, in all probability, be very largely increased, and the revenue so far benefited?—Certainly; in a case like that it would be increased 50 per cent.

721. Viscount *Goderich.*] I understand you to say that the presence of cocculus indicus is difficult to ascertain?—I believe it to be impossible, in the present state of science.

722. Lord *C. Hamilton.*] Did you ever detect nux vomica in beer?—No; I never detected nux vomica, but I feel inclined to think beer sometimes contains it; because, although I could not obtain such satisfactory evidence as would enable me now to say it exists there, I obtained such evidence as makes it exceedingly probable. I obtained with concentrated sulphuric acid, and a small crystal of bichromate of potash, a colouring which was so very much like what is produced by strychnine, only less distinct and more dingy, that I feel inclined to think nux vomica is occasionally present there.

723. What would be the effects of that?—To stupefy, like cocculus indicus.

724. Mr.

724. Mr. *Villiers.*] You have been speaking of porter chiefly; what do you say of ales and other beers?—I am restricting myself principally to porter, because I have not had so much experience in the testing of ale, except in those particular cases of which I was speaking, for the detection of strychnine; I have found nothing in ale but a deficiency in alcohol.

725. You are not aware that it is a very common fraud, in country places, where they sell beer of a low quality without a licence, that in supplying this inferior beer they make the people pay for a stronger beer, and they put this matter which is intoxicating into it?—I cannot speak to ale, but I may say that those substances, cocculus indicus, and so on, which have been used in beer, may apply to ale; they have been given to me by those two druggists of whom I have been speaking, as being extensively used in the adulteration of *beer*, which probably includes both porter and ale, and as these substances cannot be detected by chemical analysis, I cannot speak as to their being there.

726. You would suppose there was the same motive for mixing water with ale as with porter, and then introducing these stupefying properties?—Yes; only I may say I never found sulphate of iron in ale, and I have occasionally done so in porter.

727. Do you suppose that no adulteration takes place in the brewing of beer?—I do not know, but I really do not think it is possible; when you consider the *personnel*, that is to say, the number of people which surround a brewer, I think the public have the greatest security which they could possibly have against adulteration from that quarter.

728. *Chairman.*] I understand you to say you have not detected any adulteration in beer as it comes from the brewer?—No; I have found the beer from the brewers so exceedingly different from that of the publicans, that I have no doubt the adulteration is practised exclusively in the cellar of the publican.

729. Mr. *Villiers.*] I have a letter before me, in which the writer says, "We are apprised of an Excise information having been laid against a London brewer for defrauding the revenue by using quassia in his worts instead of hops." What is quassia?—It is a very bitter substance; it would act very much like gentian; there is nothing deleterious in it; still it is not hops.

730. Lord *C. Hamilton.*] You make use of the word "adulteration;" but the man who makes porter does not promise to make it of any particular ingredients, does he; he makes a beverage, and he offers it for your acceptance if you choose to drink it?—Adulteration, I take it, means this: the addition of a substance which does not impart to the article adulterated any quality whatever; for example, I do not call an adulteration the mixing of cotton with wool or with silk, because the result is an article which looks nearly as well, and which partakes of the qualities of the fabric which is made exclusively of wool or of silk. But if that article is sold as pure wool or as pure silk, it is not a case of adulteration; it is a case of fraud, according to my vocabulary. I think the fault in that case lies at the door of the vendor, but not at all at the door of the maker. In the same way, if what I understand by the manufacture of beer is the making of a certain beverage containing hops, and a certain amount of alcohol, a certain well-known compound, if you introduce water and cocculus indicus, and Foot's sugar for the purpose of sweetening, and liquor ammoniæ for the, purpose of browning, it is a case both of adulteration and fraud.

731. Mr. *Villiers.*] If these ingredients were advertised as being contained in a pot of porter, no one would drink the compound?—No.

732. Lord *Goderich.*] Do you not consider that the public believe that what the publicans sell them is composed of malt and hops?—I suppose the public believe it.

733. And therefore the introduction of other substances is more or less an adulteration?—It is an adulteration and a fraud; an adulteration, because it is introducing an article which confers no particular property, except that of poisoning, which you did not bargain for, and it is a fraud, because it is an article sold under a false, and therefore a fraudulent name.

734. Lord *C. Hamilton.*] You can brew from molasses, but that is not an adulteration, is it?—No; the sugar in that case is used for the purpose of producing alcohol; the sugar is intended to replace another form of sugar which exists in the malt; therefore you cannot call that an adulteration, even if it were not permitted by law; for the only difference between the one and the other is, that malt may be taken as a cheaper sort of sugar than molasses. But the man who

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dilutes the beer he sells under that name with water, and replaces the alcohol by cocculus indicus or any other poison, then I say such a man is a fraudulent person, an adulterator, and a poisoner.

735. *Chairman.*] There is another article of very large consumption, unfortunately, the article of gin; have you made any observations upon that?—This is an article upon the adulteration of which I can offer nothing but collateral evidence; that is to say, the same druggists who gave me the substances employed for adulterating beer, gave me a list of those which are employed for adulterating gin, brandy, and rum. Some of those, I may say, can be detected by chemical analysis. The articles used for adulterating gin are sub-carbonate of potash and alum; that is for fining. I have this information, I may say, in the handwriting of the druggists themselves, and, in comparing the lists of the two parties, they were exactly similar. Alum can always be detected in gin. Oil of vitriol is also used, and oil of almonds; that is for beading; that means, that in pouring the gin into a glass it must form a series of little bubbles which hang on the periphery of the glass. Sulphuric acid can always be detected in gin. Then grains of paradise, a kind of pepper; they are a little reddish seed, about the size of small shot; grains of paradise have a very peppery taste, and I understand they are used to replace the spirit, because the adulteration of gin is the dilution thereof. Gin is therefore adulterated like beer; water is added, and then to restore to a certain extent the taste and the inebriating quality, cocculus indicus is used.

736. You appear to come to the same conclusion here that you do with reference to beer, namely, that gin is adulterated, not by the distiller, but by the publican?—By the publican. In the year 1829 there is a case on record of several men who were poisoned after having drunk a glass of rum strongly impregnated with cocculus indicus; one of them died. This case is alluded to in Dr. Taylor's book on Toxicology; but as I understand he will be examined before the Committee, he will be the proper person to give the Committee information upon that subject.

737. All those adulterations you think are very injurious?—Very injurious; some of them are really diabolical.

738. Lord *C. Hamilton.*] Do not they put vitriol into gin?—Yes; but though oil of vitriol or sulphuric acid are somewhat terrifying names, in the proportion in which they are used they cannot be looked on as poisons.

739. *Chairman.*] Still, they would have an injurious effect?—I believe you cannot add to food any chemical compound whatever with impunity.

740. Mr. *Kinnaird.*] Do you consider pure gin, in moderation, a wholesome drink?—Not more so than any other alcoholic drink.

741. *Chairman.*] You would not consider pure gin, in moderate quantities, injurious to the constitution, would you?—No more so than pure brandy. Then comes the question, what moderation is?

742. Mr. *Villiers.*] You think these adulterations are so extensive, that if any one were to meet with pure gin in London, he would be very much surprised?—I do not think it is to be had from publicans at any rate.

743. Lord *C. Hamilton.*] What ought pure gin to be made of?—I really do not know, because I am not very well acquainted with the manufacture of it; I believe it should be nothing but spirit, distilled from different forms of sugar, either malt, rye, or some fermented grain or other.

744. Mr. *Wise.*] Does not the juniper berry enter largely into its constitution?—I believe the juniper berry never exists in English gin; in Hollands it does, but gin, I believe, is only distilled from grain.

745. The juniper berry is only used in foreign gins?—In Hollands.

746. In Holland they drink that spirit very largely, do they not?—Yes.

747. Mr. *Villiers.*] We know the amount of alcohol in gin; the distiller is obliged to make that known, is not he?—I do not know.

748. If he were, that would be a ready means of detecting adulteration?—Yes.

749. Mr. *Wise.*] The term used by publicans is a correct one; they use the expression "fancy gins;" gins made to suit the fancy of their customers?—That is so; the difference between the gin of Mr. A. and Mr. B. altogether depends upon the compounds which are added to it; the taste of the gin bought at various places differs very much.

750. Mr. *Villiers.*] It is the favourite spirit of the people of London, is not it?—I think so; they consume large quantities of it.

751. *Chairman.*]

751. *Chairman.*] It is generally consumed in a raw state, is not it?—Yes; generally I believe by people standing at the bar, who come in, drink a glass of gin, and go.

752. You say other spirits are equally adulterated?—In some cases they are. The case which I spoke of in 1829 arose from drinking rum; it always amounts to this, with respect to all spirits: the object is to sell water for spirits, but if you put in water you remove, so to speak, a certain amount of alcohol, and then the ingenuity of the publican comes into action to restore the intoxicating property.

753. And that is often done by the addition of some deleterious article?—I should say always.

754. Have you detected any particular substances in brandy?—No; I believe it is manufactured extensively in this country, especially since the discoveries of modern chemistry, of producing essential oils artificially, oils which have the odour of that particular ether to which brandy owes its flavour; in the same way, pine-apple rum is often nothing more than spirit manufactured in this country, and to which the flavour of the pine-apple has been given by the introduction of a few drops of those new essences, the production of which is one of the most beautiful discoveries of modern chemistry.

755. *Chairman.*] Are they produced from the original fruit?—No; for example, from rotten cheese, by treatment with sulphuric acid and bichromate of potash, you may produce immediately a very fragrant fruity essence.

756. Mr. *Villiers.*] You must carry on such a process with very great skill, must not you; if you introduce too much it would be easily detected?—Certainly; but only the quantity necessary to give the required flavour is used. Fusel oil is a kind of oil which is produced in the distillation of grain; it can be removed, and is removed by the rectifier. I have seen large quantities of this oil at Messrs. Bowerbanks' large distillery. He took great pains to separate this fusel oil from his spirit, but it was a perfect waste. It was used for burning in his establishment; but now the chemist can produce from that fusel oil, or hydrated oxyde of amyle, as chemists call it, essence of jargonelle, an essence which has precisely the odour of the finest jargonelle pear.

757. Is not there creosote in that?—No; what is occasionally produced, if it is not carefully manufactured, is valerianic acid; that partakes of the jargonelle odour, but it is offensive. What I say, therefore, is, that owing to chemists having been able to manufacture a great many fruity essences, if I may so call them, they have been able to supply the perfumer with essences which otherwise must have been very costly, and the distiller with the means of imparting to certain spirits the flavour of the genuine liquids from which it should have been obtained. Brandy is made, as everybody knows, by submitting a low-priced and strong Bordeaux wine to distillation. The odour of the brandy is due to a portion of essential spirit, or ether, which distils over with the alcohol. Hitherto the flavour of brandy could not be imitated; what was called British brandy was an abominable stuff; but now French brandy is manufactured in London. I cannot say that it is so good as real French brandy, but it certainly is a great step in advance of what British brandy was originally. Artificial British brandy now is drinkable, and may be palmed, as it were, on the unwary for French brandy.

758. Mr. *Villiers.*] Is it white brandy?—The colour is nothing; they colour it with a little caramel.

759. *Chairman.*] Have you examined the milk in London at all?—I have; the pump is the adulterator of milk, but there is something very disgusting in the way in which the milk is obtained; in Clerkenwell I had occasion, some time ago, to go to see a well, to examine the water which was obtained from it, and I saw there a spectacle which prevented me from tasting milk for six months. I saw about 30 or 40 cows in the most disgusting condition one can possibly conceive, full of ulcers; their teats in a most horribly diseased ulcerated condition, and their legs also full of tumours and abscesses; in fact, it was terrible to look at; and the fellow was milking these poor cows in the middle of all this purulent abomination. I have been told since, that that is by no means an exception, but that the animals of a great many cow-keepers are in the same condition; so that what is introduced into the milk besides the water, which is comparatively nothing, is actually the product of disease. I have no doubt diseased matter is thus introduced into the milk; I assure you that for six months

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afterwards I could hardly touch milk, the horrible sight was always recurring before my eyes.

760. Lord *C. Hamilton.*] How long ago was this?—About two years ago.

761. Since milk has come so much by railway?—Yes.

762. Mr. *Villiers.*] Was this an accidental occurrence that the cows were in this state, or were they cows which had been got rid of by other people?—I really do not know.

763. *Chairman.*] I suppose the manner of keeping the animals induces disease?—Yes; and the litter on which they were was a mass of fuming and fermenting matter; it was more as if they were standing on a dung-hill than upon litter.

764. Mr. *Wise.*] They were not fed on grass, probably?—I do not know; the poor brutes were in the most disgusting condition that could be imagined.

765. *Chairman.*] Have you reason to believe that there are many such dairies or cow-feeding establishments?—I have been told so by people who, I think, do know, but the one I mention I actually saw.

766. Mr. *Kinnaird.*] Have you frequently analysed different descriptions of milk in London?—Yes; it is always watered.

767. Have you ever found chalk?—No, I never found chalk; it would be a stupid means of adulteration, because it would subside.

768. *Chairman.*] Have you found sheep's brains?—No.

769. Mr. *Villiers.*] Could not any one detect the large proportion of water which you speak of?—Yes.

770. How do they keep up the appearance of milk?—Milk will bear an enormous quantity of water without being much deteriorated in appearance; you may introduce three-fourths of water into milk, and yet it will still appear to be milk; there will not be much difference; it has only a bluer tinge.

771. Could you detect the actual proportions of the water?—You could by proper investigation: by means of a galactometer you could do so; none of these instruments, however, give very accurate information, but they give an approximate result. A galactometer is a glass tube divided into 100 parts; pure milk is poured into that glass so as to fill it; it is then left undisturbed, at a temperature of from 60° to 68° Fahrenheit (46° to 47° are said to be the temperature which gives the greatest result); but for practical purposes, from 60° to 68° is the one on which I have generally operated. I find that after 12 hours pure milk gives eight of those divisions or degrees of cream; if the milk is diluted with one-third water, I find that I obtain only six divisions of cream instead of eight. If diluted with half water, I obtain five divisions; and if diluted with two-thirds water, I obtain three divisions only of cream. I should say that this is only an approximating sort of test, because the quality and kind of food which is given to the cows as food, influences a good deal the proportion of cream which is obtained.

772. A good deal of milk is sold, avowedly, as being skim milk, is not it?—Yes; there is another way in which you can arrive at something like a correct result; if you take 1,000 grains of milk and evaporate it at a gentle heat till it ceases to lose weight, you obtain a residue which averages 70 grains. If another portion be treated with vinegar or acetic acid and coagulated, and the curds which are produced by the acetic acid are separated and squeezed in order to give back every part of the liquid they contain, and the liquid evaporated at a steam heat, you will find from four to five per cent. of dry residue left.

773. *Chairman.*] With reference to milk obtained from diseased cows, I suppose you have no doubt that milk so consumed by the inhabitants of London must be very injurious to health?—Very much so.

774. And if given to children, particularly so?—Decidedly so; and I will take advantage of this opportunity, if I am permitted, to mention something which occurs to me at this moment in reference to another article on which I have already given evidence, namely, bread. I have known bread made from water in a most disgusting state. There was, a few years ago, on the canal, a bread factory, and the water taken for making the dough was actually taken within a foot of a cesspool. There was an overhanging privy, and within a foot of that there was the pipe connected with the pump. I say this to illustrate my opinion, that all these "mickles make a muckle" in the end. There is a great quantity of diseased, corrupting, or infectious matter absorbed or taken into our food from the water which we use, the milk we consume, and other substances used as food or drink, all of which, if only taken once or twice, would not do much

much injury, but which being constantly repeated, and re-injected, must do very great mischief. The *excreta* certainly were never meant to be taken in again, and I am satisfied that a great many of the diseases, and the epidemics which visit and devastate this metropolis, are referable to such causes.

775. Mr. *Kinnaird.*] Have you ever analysed the manufacture of London cream?—I have not.

776. Lord *C. Hamilton.*] There would be much greater facility in that for fraud and adulteration without detection, would not there?—I should say so. With respect to bon-bons and confectionery, my evidence is corroborative of Dr. Hassall's. I have found in confectionery of that kind arsenite of copper for green colouring; for yellow, chromate of lead, orpiment, sulphuret of arsenic; for red colours, red lead and vermilion.

777. *Chairman.*] Have you examined Cayenne pepper, and do you concur with the statements of Dr. Hassall as to that article?—I can confirm what Dr. Hassall has said; I have found several times red lead in Cayenne pepper, but, generally speaking, the adulteration is ground rice and brick dust, which appears to be a very valuable article for the purpose of adulteration, and common salt, also, to a very considerable extent. Some of the samples of Cayenne pepper I have examined have been scarcely anything but common salt coloured with a little Cayenne pepper. Cheese is sometimes adulterated, but there is only one case on record of red lead having been found in cheese; that was traced to the annatto, which is a colouring matter employed for imparting a creamy yellow colour, and which, in the case alluded to, had been adulterated with lead, and that annatto having been used for colouring the curds, the cheese was of course poisoned; a gentleman who partook of it nearly lost his life in consequence. With respect to pepper, that is an article which is adulterated to a considerable extent; it is adulterated with husks of white and red mustard; in fact, the "Times," on the 10th of May 1852, states that one Tibbald, a grocer, at Chelmsford, was fined 50*l.*, evidence being brought forward to show that a cask had been seized, the whole bulk of which was 100 lbs., and which contained only 2 lbs. of pepper, the rest being husks of mustard, chilis, and rice.

778. Lord *C. Hamilton.*] None of those are noxious in their qualities, are they?—No, it is only a fraud, making a difference between the terms "fraud" and "sophistication." Rapeseed cake is employed extensively in the adulteration of pepper, and also linseed cake; so also ground clay and potato starch. With respect to water, it is quite refreshing to think that something is about to be done to give us a pure supply. Water is the only substance which I know of which, to be fit for consumption, must not be pure, that is to say, it must contain some air. Pure water is, of course, a chemical affair, and contains no air whatever; it consists of water, and nothing but water; but such water is unfit for consumption, because it contains no air; it is indigestible, heavy, and in fact it would appear that distilled water, which is pure water, and which is supplied to the Navy occasionally from stills erected for the purpose on board, is actually so vapid that after a few days' use the sailors will hardly drink it. Some years ago that subject engaged my attention for the purpose of producing water for the use of the Navy, and I have succeeded in producing water perfectly aërated and wholesome. I am now erecting at Heligoland, by order of the Government, 12 apparatuses of that kind. I only allude to that for the purpose of saying that water, in order to be salubrious, must contain a certain quantity of air. There is a recommendation which has been occasionally made by Dr. Lyon Playfair, among others, of boiling water procured from impure sources; I mean such sources as the water companies resort to. Dr. Lyon Playfair and other eminent men have rightly enough recommended that all such water should be boiled before use; unfortunately, distilled or boiled water contains no air; consequently, water so produced is quite unpalatable. But there is something worse than that; it is, that by reason of its containing no air, it has a great tendency to take air from the medium where the water is kept; so that if distilled or boiled water, which contains no air, is kept in a ship's hold, or in an impure dwelling, it will absorb precisely the quantity of air which it can absorb, namely, five cubic inches per gallon, and become perfectly putrid and fœtid or contaminated by organic matter; this is an important consideration; water should always be kept, when it has been distilled or boiled, in perfectly ventilated rooms or pure receptacles, or else it will become as foul as, or more foul than before. Dr. Stenhouse, three or four years ago, found that charcoal had the power of purifying air; now I have found, since acting upon his data, that charcoal has the

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same power of purifying *aërated* water which contains foul organic matter, provided only the water is aërated; that is to say, contains air. Hence it is, that if the water companies were to pass the water through large filters containing charcoal, the water so obtained would be rendered perfectly sweet. My own experience has taught me, in reference to my apparatus for the distillation of sea-water, to which I was alluding just now, that two cubic feet of charcoal are sufficient to purify perfectly 500 gallons of aërated water per day; and the value of this suggestion which I beg to make is increased, I think, by the fact that the charcoal does not require renewing; that is to say, when once the filter is made, it will last for ever, because it disinfects the water as it does the air, not by mechanical separation, but by actual destruction; organic matter undergoes in the pores of the charcoal, in the case of air, a process of slow combustion, so that the organic matter which rendered the air foul becomes converted into carbonic acid and water. This is what Dr. Stenhouse found, and it is a most important discovery; starting from his suggestion, I found that the same effect was produced upon water when that water contained air; that is to say, water which contains five cubic inches of air per gallon, may be thoroughly disinfected by the slow burning of the organic matter which it holds in solution, and which slow burning is effected by making it traverse a mass of charcoal. That water has the power of absorbing and dissolving organic matter in this way, may be illustrated in a very simple manner. If you distil water, from whatever source, the distillate will be fresh water, a pure water; but it will have a peculiar empyreumatic odour and taste; a smell and taste which renders it undrinkable for a while. If, when it has become sweet again by standing, that water which is then pure is re-distilled, you will have the same empyreumatic smell over again; why is this? Because in standing, as it contains no air, it will have re-dissolved the air of the chamber in which it was kept, and it will have re-dissolved along with that air whatever organic matter was present in infinitesimal quantities; that is to say, in very attenuated masses; and it will become again empyreumatic when submitted to distillation. The only condition which is necessary, therefore, that the water should not become putrid again is, that it should be aërated, because when once it contains as much air as it can possibly take up, it can take no more; it is like a sponge when filled with water; the sea may pass over it without putting into it a drop of water more; and it is owing to this, that when on board ships a supply of fresh water is taken in for the use of the crew, after about a fortnight that water becomes putrid and almost undrinkable; because the organic matter which that water contained is undergoing the process of putrefactive fermentation, and the water becomes undrinkable. The water remains about a month in that putrid state, but it gradually becomes sweeter and sweeter, till it becomes drinkable again, because all the organic matter it contains has resolved itself into other elements, and the water then contains no longer any organic matter; but as the water is filled with air, it cannot absorb fresh air, and therefore it remains perfectly sweet. When, therefore, we conceive that the water which is supplied to this Metropolis hardly anything else but diluted mud and sewer refuse; that it contains the excreta of two and a half millions of inhabitants, their daily ablutions, the washings of their foul linen, and the filth and refuse of hundreds of factories; the offal of markets, the foul matter of slaughter-houses, and the purulent abominations of hospitals and what not; I think it is astonishing that we are not much worse off, in point of public health, than we really are.

With respect to the adulteration of medicinal and other substances, I found that acetate of copper was adulterated with chalk; annatto, with ochre and red lead; asafœtida, with chalk, clay, and sand; bi-carbonate of potash or soda, with neutral carbonate, with chloride and with sulphates of the same bases; cream of tartar, with chalk, with alum, and sulphate of potash; calomel, with chalk, sometimes to the extent of 60 per cent., with sulphate of barytes, and with white lead—the white lead itself being adulterated with sulphate of barytes, with sulphate of lead, and with chalk; carbonate of soda, with sulphate of soda; chromate of lead, with sulphate of barytes, carbonate of lead, and carbonate of lime; copal, with gum-anime, gum-dammar, and common resin; cochineal, with sulphate of barytes, and with Venetian talc; iodine, with water, with black lead, sometimes to the extent of 25 per cent., and with crude sulphuret of antimony; linseed-meal, with bran, with clay, and with saw-dust; litharge, with earthy matter; magnesia, with lime, with a species of clay called kaolin, with carbonate of lime, and sulphate of barytes; mercury, with lead, with tin, and with bismuth; nitrate

nitrate of potash, with common salt; and nitrate of silver, with nitrate of potash.

779. Have you the result of any investigations in reference to opium?—Yes; opium is adulterated, whether here or abroad I do not know; it contains starch, mucilage of gum, clay and sand. Quinine is adulterated with gum, with starch, with chalk, sulphate of barytes, and stearine.

780. Do not those adulterations render it very difficult for physicians to calculate the effects of their prescriptions upon their patients?—Of course. If quinine is given in the hope of preventing ague, and you give gum and starch, or stearine, you cannot produce the effect you desire.

781. Mr. *Wise.*] Have you found simple articles, such as rhubarb and Epsom salts, adulterated?—No; what I have related now I have actually found; there are a great many other adulterations, which I know are practised, but they have not come under my personal examination.

782. You are aware that the great mass of the people buy what are called patent medicines or pills?—So I understand.

783. Have you ever examined those patent medicines?—I had rather not speak about them.

784. They are used to a very great extent?—They are; I cannot speak as to them with the same degree of certainty which I can with respect to other things; with respect to those other things, I have given only the result of my personal experience.

785. Are you aware that in Paris there is what is called the Conseil de Salubrité?—I am.

786. Are you sufficiently aware of the course which is pursued in Paris on this subject to be able to offer to the Committee any suggestions as to a similar course which might be adopted here?—Some good is done in Paris by the Conseil de Salubrité, but much less good than ought to be the case. Those Conseils de Salubrité Publique consist of the préfet, who is the president. Then there is a vice-president, who is a man of great standing, too; 12 members from among the first chemists in Paris, 5 adjuncts, all first-rate men, and 12 honorary members, all first-rate men; so that you have every guarantee which quality and quantity can furnish; but then they meet only once a fortnight, and you can hardly expect that a poor man who buys half an ounce of coffee, and finds it is adulterated, can go to them for redress; he does not know where or how to get at the Council; it is only when the inspector goes about and secures a sample, which appears to him what it ought not to be, that he refers to this Council of Health, and then the man is punished. But though that does not do all the good it ought to do, still the very fact that there is such a Conseil de Salubrité, and that a dealer is liable to be visited with punishment, and, which is worse than that, with the loss of character in his business and his neighbourhood, always acts very beneficially. Therefore I am inclined to think that if each parish or district had, according to its importance, a certain number of men of acknowledged probity and capacity, men who would have no interest in acting in a vexatious manner, but to whom cases of adulteration could be at once referred, or respecting which advice could be at once taken, a great deal of good might be done in this country. I apprehend you could not altogether do away with adulterations and sophistications, any more than you can do away with theft and other dishonest practices, because, of course, there is in all large communities a certain number of bad people, but at any rate it would singularly diminish the number of cases. At present competition, instead of being what competition ought to be, a competition of skill as to who shall produce the best article at the cheapest price, is now really a competition as to who shall adulterate with the greatest cleverness. What a tradesman tries to do now is, not to gain a victory over his neighbours by supplying either a better article or the same article at a cheaper price, but his endeavour is, "How shall I take my neighbour's custom from him by offering an article which will look as well, but which will cost me less and which I can sell cheaper?" and then he sets about debasing the articles, and very often succeeds in robbing the honest trader of his fair share of custom.

787. *Chairman.*] And sometimes poisons his customers into the bargain?—Yes, and then the honest man in self-defence begins to adulterate too; so that it is a wide-spread evil which has invaded every branch of commerce; everything which can be mixed or adulterated in any way, is sophisticated and debased.

Mercurii, 25° die Julii, 1855.

MEMBERS PRESENT:

Viscount Goderich.	Mr. Sheridan.
Mr. Wise.	Mr. Moffatt.
Viscount Ebrington.	Mr. Peacocke.
Mr. Gregson.	Mr. Scholefield.
Mr. Kinnaird.	Mr. Swift.
Mr. Knight.	Mr. Villiers.

WILLIAM SCHOLEFIELD, Esq., IN THE CHAIR.

John Simon, Esq., called in; and Examined.

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788. *Chairman.*] YOU are connected with the City of London as its Officer of Health, are you not?—I am.

789. You have, of course in that capacity, had abundant opportunities of noticing what it is which affects the health of the inhabitants of London?—I have made it my study.

790. Have you directed your attention at all to the influence of the adulteration of articles of food and drink?—The City of London exercises no jurisdiction in that matter, and therefore I have had no special opportunity of examining it; and perhaps I shall save your time by saying that I am not competent to speak on the details of adulterations. I have made no special investigations of them, but have looked at the subject merely as one for legislation.

791. Can you speak, of your own knowledge, to the fact that adulteration does exist?—Yes, to a certain extent of my own knowledge; but I know it far better by the testimony of chemists and microscopists who have devoted themselves to that inquiry.

792. And you have no doubt that the existence of that adulteration is very injurious to the public health?—I have no doubt that it is injurious.

793. Have you turned your attention to the remedies which it would be desirable to employ, for the purpose of putting an end to this frightful system?—Yes, I have thought of some remedies. It appears to me that the person who suffers by the fraud, ought to have his remedy by some summary proceeding before a magistrate; and beyond that, I think there should be a power of proceeding vested in certain local authorities. I think such a remedy should be in the hands of local authorities, because, generally speaking, the individual who suffers, suffers from time to time in such small proportions, and so unconsciously, that he is scarcely a fit judge of the amount of injury he sustains; for instance, in the case of water (if that is a subject within the cognizance of the Committee) the people who drink the filthy water which is distributed over part of the south side of London are not competent judges of the amount of injury it may do them; and for any individual there to attempt to proceed against the venders of that water would of course be out of the question. So with the adulteration of drugs, not only among the poorer classes of society, but among the more educated classes of society, it would be ridiculous for any average individual to pretend to judge whether the dose of laudanum he buys is of standard strength, or whether the scammony he buys is half adulterated with chalk. It would be out of the power of any such individual to make these analyses; and because of that incapacity on the part of the persons who suffer, I think that local boards, through competent officers, ought to have power to interfere in such cases.

794. Lord *Goderich.*] Would you propose that the Local Boards of Health should be the local authorities who should be charged with the duty?—Local Boards of Health, strictly speaking, that is to say, Local Boards under the Public Health Act, exist only in few parts of the country; but I think the local board, whatever it may be, which is charged with the administration of the Nuisances Removal Act, might be a competent Board for dealing with this matter. In places

which

which are under the operation of the Public Health Act, this local authority would be a fully constituted Board of Health; in other places it would be some other body. I think this Board, administering the Nuisances Removal Law, should have the power of proceeding *in certain cases* against the venders of adulterated goods; and whether a penalty is to be recovered or not, at least this Board should have the power of publishing the names and addresses of offenders. I am inclined to think that publicity, if it were sufficiently procured, would be a very important element in the cure, whether further remedies be also introduced or not.

795. Do you think persons to be appointed inspectors of nuisances under the Nuisances Removal Act, now before Parliament, would be persons competent to make the necessary investigations for detecting adulterations?—Certainly not; but this is a department of medicine which is gradually growing up to meet a new requirement, and I suppose, before many years have elapsed, there will be in most parts of the country the power of referring to some competent person to give evidence in cases of the description referred to. In large towns there will be the public health officer, the officer of health for the town, appointed under the Public Health Act; in other places probably there will be some other medical officer competent to give evidence.

796. Still you would think it a great advantage that there should be, in every small district, such as those contemplated by the Nuisances Removal Bill, some authority charged specially with the power of taking proceedings against adulterators?—Certainly; for although, in some of the smaller localities, the power might perhaps for years remain dormant, yet, from the first, it would be worked in the large districts very usefully; in London, for example, and other large towns.

797. Mr. *Wise.*] If a person who might be called a chemical inspector were connected with any of the public authorities who might be authorised to prosecute, do you think he, by an analysis of the article, might give a great deal of useful information?—Undoubtedly.

798. Are you aware that, by the 6th & 7th Will. 4, flour, if proved to be adulterated, is treated in the manner to which you allude? If a person having adulterated his flour is found guilty, his name, the place he inhabits, and his offence, are to be published in the papers?—Yes.

799. And he is liable to be fined 20 *l.* for each offence, and 10 *l.* if any of the ingredients be found upon his premises?—I am aware of that; it is a formidable list of penalties.

800. If I understand you correctly, you would, as far as possible, introduce the principle of that Act in all cases of adulteration?—Subject, as far as I can see, to another principle. It strikes me that your object would be to punish adulteration only where it threatens to be hurtful to health. *Quoad* the mere commercial fraud, I apprehend it would be contrary to the general intention of your legislation to deal with it. The vender of adulterated flour, I presume, would be punished not for his commercial fraud, but for a practice endangering health. The buyer of damaged corn, or adulterated flour (if such damage or adulteration were indifferent to health) would not require to be protected by any special legislation against fraud, any more than the purchaser of a horse or an umbrella. Against commercial fraud, as such, the law does not profess to act preventively: the purchaser's wit is supposed to fulfil this object; and, if cheated, he has his remedy at law. But where the fraud becomes hurtful to health, and the individual's means of detecting it are insufficient, there seems to be good reason for organising public means of prevention.

801. You would exclude from the liability to penalties the person who fraudulently mixes an inferior with a superior article, but you would punish what is termed in one of our works, the surreptitious introduction of articles which taken in large quantities are prejudicial to health?—Yes.

802. And any admixture of deadly poisons used to improve the appearance of the articles adulterated?—Undoubtedly.

803. You are aware that in Paris there is a Conseil de Salubrité Publique, which takes cognizance of these matters?—I am; and that brings me to a point which was in my mind just now, when I was speaking of the power which should be given to local boards. I said they should be authorised to prosecute in respect of certain adulterations, and I apprehend it would be the business of whatever Conseil de Salubrité might be advising the Government in this country, to decide what are the cases in which adulterations are hurtful to health. The

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end might be probably attained in such a way as this: the Privy Council—either of itself, or moved by the Board of Health (which one supposes would be advised by proper pathological authorities)—should from time to time publish a schedule of adulterations hurtful to health; and against all these cases there should exist a power of procedure vested both in the individual aggrieved, and in the local boards to which I have adverted.

804. In every case you would have a kind of public prosecutor, in the form of some local authority?—Yes.

805. To encourage proceedings, would you not, where penalties were imposed, give a moiety to the informer, and one-half to the county-rate or the borough-rate; or would you give damages to the parties who had been injured?—I am not a very good judge upon that matter.

806. Viscount *Goderich*.] Would you suggest the establishment of a Central Board, such as the Conseil de Salubrité, or would you leave it to the Board of Health to put the Privy Council in motion?—I think if the Board of Health is to be constituted according to its title, it would be the only proper authority to deal with subjects of this kind. There seems at present to be a considerable distribution of sanitary responsibilities; little dabs of doctoring are done by several departments of the Government; but it would probably be desirable that so important a matter as this should rest with the Board of Health, unless it is intended that the Board of Health should be only a Board of Works.

807. Therefore, you certainly would not think it desirable to entrust this central authority to anybody connected with the Board of Inland Revenue?—As far as I know the constitution of the Board of Inland Revenue, there is no element in that Board which is capable of advising on matters relating to health.

808. Does not there exist, in connexion with the Board of Inland Revenue, some body of chemical advisers?—I believe they have chemical advisers; but it would require more than chemical advisers to do justice to this subject. Chemical advisers would make the Board thoroughly informed as to the presence of certain adulterative ingredients in matters referred to them; but chemical advisers would not of necessity be competent advisers as to the effect of such admixtures on the public health.

809. Mr. *Moffatt*.] You stated, in the first part of your evidence, that there were extensive adulterations of articles sold to the public; can you state in what articles that adulteration exists?—There is one example which is not verified by myself, but it is so extreme a case that I may mention it. In the Pharmacopœia of the College of Physicians there is a drug, I believe it not to be a very important one, which is called calamine. It being in the Pharmacopœia of the College of Physicians, we may prescribe it at any moment. I am informed by my colleague, Dr. Thompson, who is professor of chemistry at St. Thomas's Hospital, that for years there has not been a specimen of calamine in the market; that what is called such is made of all sorts of things imitating the colour, and to a certain extent the texture of calamine; but of the article so mentioned in the Pharmacopœia of the College of Physicians, there has not been for a length of time a specimen in the market.

810. That is not a drug in extensive use?—It is not.

811. Can you mention to the Committee any articles of great and general use which come within your own knowledge as being adulterated?—A day or two ago I happened to be in a pickling establishment, not on the business of looking after adulterations, but on other matters. I saw a person employed on the establishment chopping up fish, and seeing by his side a keg of red stuff, I asked permission to gratify my curiosity by looking into it; he was slicing his fish on a reddened slab, and obviously this was a pigment intended for admixture with the fish. I asked what it was, and was told it was Venetian red; that the public did not like their anchovies unless there was a particular colouring with them, and this was kept for the purpose of that admixture. Here, perhaps again, is not a very important admixture. But I may name the notorious adulteration of bread by alum.

812. That you believe to exist to a very great extent?—I believe it to exist almost universally.

813. What per-centage of alum do you believe to be inserted in the bread which is generally sold to the public?—I cannot speak to that.

814. I understand you propose, in any case of adulteration of food or drugs which

which is prejudicial to health, to give a summary power of procedure before a magistrate?—Yes.

815. Who would you propose should test the adulterations, and decide whether they exist or not; is the magistrate to do it?—In prosecutions by a local board, some specially qualified officer of that local board would do so.

816. Of what local board?—There would be the same quality of evidence as is now often given in criminal cases to prove the presence of poison in a body.

817. You generally call in any medical man who may chance to see the body, do not you, in such cases as you allude to?—And who tests for the presence of poison, just as the local officer in the cases referred to would test for the presence of the adulterating material.

818. Is the witness generally, in the cases you have alluded to, a member of any local Board; is not he generally any medical man in the neighbourhood who chances to see the body of the deceased?—Yes.

819. How would the magistrate decide as to the fact or the degree of adulteration?—I assume that the local Boards exercising the powers vested in them would appoint a properly qualified person to make analyses.

820. That answer assumes, does not it, that we are to have local Boards of Health established throughout the United Kingdom, with powers extending to every village or small town in the United Kingdom?—On the contrary, I pointed out, in an earlier part of my evidence, that there were certain parts of the country in which local Boards of Health would exist under the Public Health Act, but in the greater part of the country no such Boards would exist. In all such places, however, there would be local Boards for the purpose of carrying out the Nuisances Removal Act, and those local Boards, although not fully constituted Boards of Health, might exercise the power of inquiry.

821. You propose that there should be an officer attached to the Board which is proposed to be constituted under the Nuisances Removal Act, who should be charged with the protection of the food of the public from adulteration?—Whenever the local Board thinks it necessary to exercise those powers, either a special officer should be appointed, or that particular duty should be added to the previous duties devolved on the officers already existing; in districts where there is an officer of health appointed, he should be the examiner.

822. And you would have him merely empowered to test cases of delinquency, or presumed delinquency, before the magistrates?—Yes.

823. Mr. *Wise*.] You are aware that England is divided into divisions for the purposes of the poor-law; as Boards of Guardians are appointed to watch over the interests of the poor, might not they be the proper bodies to superintend such a matter as this, and to appoint a chemical inspector to report to them any cases which might be brought before him?—The tendency of the Nuisances Removal Bill, which has already passed the House of Commons, is to remove as far as possible the care of the public health from the Boards of Guardians, and to vest that power in other local authorities.

824. In many districts, you are aware, they are not likely to adopt the clauses of the Board of Health Act?—The clauses of the Nuisances Removal Act must be adopted, I believe, throughout the country.

825. Viscount *Goderich*.] The Nuisances Removal Bill provides that an inspector of nuisances shall be appointed by the local authority, whatever that authority may be?—Yes.

826. And one of his duties is to inspect and inform against bad meat, vegetables, and other articles of that kind?—Yes; officers of that kind exist in the city of London; and there is a very large condemnation of damaged food.

827. Those inspectors of nuisances are, by the Bill now passing through Parliament, to be appointed in every district of the country, are they not?—Yes.

828. Mr. *Moffatt*] In the evidence you have given, you have drawn a distinction between adulterations which are prejudicial to health and those which merely depreciate the quality of the goods; how would you treat the case of bread, which is mixed with potatoes; would you say that was an adulteration prejudicial to health, or only a deterioration of the quality of the bread?—To a man who can only afford to spend 3*d*. a day upon his bread, whether he gets his threepennyworth of bread made of wheaten flour, or the same bulk of wheaten flour mixed with potato flour, is an important sanitary consideration.

829. You would class that among the adulterations which are prejudicial to health?—I should be disposed to do so, as far as my own judgment goes; but

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I have ventured to suggest to the Committee that the formation of a schedule of cases to be dealt with as prejudicial to health should rest with some fully competent medical tribunal advising the Executive.

830. Mr. *Peacocke.*] And you would be inclined to leave cases of that kind to be determined on by those who had to adjudicate upon questions of adulteration?—Yes.

831. Mr. *Moffatt.*] How would you treat the case of noyeau, in which there is a considerable amount of prussic acid?—I suppose you might trust to the discretion of the prosecuting local Boards not to trouble themselves with what may be called the mere fopperies of the subject.

832. There would be an actual vending of poison there, would not there?—The consumption of noyeau is not large among the uneducated classes.

833. Mr. *Peacocke.*] The decision of those particular cases would rest with those persons who had to decide upon the general question?—I presume so.

834. Do you propose that the chemical inspectors should have the power of prosecuting, or should the individuals prosecute, and would they be simply called as witnesses to state whether the matters charged with being adulterated did contain articles of adulteration?—Wherever the local Board should be the prosecutor, I presume the officer of the local Board would be a witness in the case; but wherever individuals should prosecute, I presume it would rest with those individuals to supply their own evidence.

835. Do you know of any proceedings having taken place under 6 & 7 Will. 4, c. 37?—I cannot recollect any.

836. Then virtually it is a dead letter?—Perhaps not entirely so, but I suppose it is well known to be nearly inoperative.

837. You stated that you thought the powers of the Act would be dormant in small districts; why do you think that would be more the case in small districts than in large?—I meant nothing further than that in smaller and less opulent districts, the application of knowledge generally is a slower process than in the wealthy and more populous districts. There can be but little doubt that in the larger towns, such as London and Manchester and Liverpool, if there were laws against adulteration, special officers would be appointed by the local Boards, or it would be made an additional duty of existing officers to maintain a constant watch over adulterable matters provided for in such laws: but that could hardly be the case in the poorer districts. With respect to the adulteration of drugs, I would beg to say that I think it a matter of very great importance as leading to the uncertainty of pharmaceutical preparations. Assuming the facts to be well established, they deserve deep consideration. It is stated, on good chemical testimony, that some of our most frequently used medical preparations vary largely in their strength. One hears of prussic acid, which is given, as the Committee well knows, two or three drops to a dose, and which varies 50 per cent. in its strength; one hears of laudanum and opium varying fourfold, or sixfold, or eightfold in strength. Now, it will be obvious, of course, that very great evils may arise from our having professionally no certain standard of a dose. It is impossible to name a standard dose which shall not be liable to considerable range of effect; you cannot, with security, prescribe a definite dose and predict definite effect when that is the condition of the drug market. The College of Physicians and the Apothecaries' Company exercise, I believe, concurrently some jurisdiction in this matter; but I am informed that their jurisdiction is only within the boundaries of the City of London, so that it does not affect even the Metropolis generally.

838. Mr. *Moffatt.*] Have you any positive and personal knowledge with respect to the adulteration of drugs?—I have not much personal knowledge; but in the hospital to which I am surgeon the practice is adopted of examining carefully all drugs which are supplied to the apothecary's department; and my information is chiefly derived from frequent conference with Dr. Thomson, the gentleman who makes those examinations, and who will presently give evidence to the Committee.

839. Do you find frequent adulteration in the drugs which are sent in to the hospital?—In those which are rejected; not in those which are used within the hospital.

840. Mr. *Swift.*] From whence do you usually get those supplies?—From various wholesale dealers.

841. Mr. *Peacocke.*] In your private practice, have you sometimes been surprised by a prescription not having the effect which you thought it likely it would produce?

produce?—I have sometimes been surprised with the disproportionate effects of doses, but that would occur, no doubt, much more in the poorest neighbourhoods in London, where my own practice does not lie.

842. In your own practice, have you found a marked difference in drugs purchased from different chemists' shops?—I cannot establish that. I have observed a difference in the effect of doses, but, in the absence of exact chemical analysis, one cannot say with certainty how much of this arises from some peculiarity of habit in the patient himself.

843. *Chairman.*] It is suggested that the list of substances which competent medical men should declare to be employed by admixture with articles of food should be published; and that the detection of those forbidden articles should be entrusted to the care of properly qualified analytical chemists, they being persons who might readily detect their presence, whereas, generally speaking, a Board of medical men would hardly know how to set about it. Do you think that a Board of medical men would be the proper authorities to act in a case of this kind, or do you think a special body of analytical chemists should be appointed for the purpose?—Analytical chemists would, undoubtedly, in many instances, be the best officers to establish facts of adulteration; but I do not think they would be the best persons to advise upon the sort of schedule I have suggested, which would be a list of articles falling within the operation of the law on the ground of their dangerousness to health. I think, as regards the publication of a list of that kind, that whatever tribunal might be considered suitable for advising the Executive generally on matters relating to health, would be best for this purpose also. Such a tribunal would be mainly composed, no doubt, of medical practioners.

844. Mr. *Villiers.*] Do you think that no persons who are not medical men could act in such a capacity, as that of detecting substances which are prohibited to be mixed with food?—It appears to me that there are two separate questions. In the case of anchovy sauce, for example, take the fact of there being mixed with it a great quantity of ferruginous clay, bole armenian, or venetian red, or something of that kind; on that fact the testimony of chemists would be the best evidence. But when it comes to the questions—how does this affect health? ought it to be a matter of prosecution? ought I to be entitled to proceed against an Italian warehouseman, because he sells me anchovy sauce with this red stuff in it? I think that part of the inquiry is not be a chemical, but a pathological and medical question.

845. Some body of medical men should determine you think upon this schedule of prohibited articles?—Yes.

846. When that has been done, might not persons of an inferior grade to that of medical practitioners be sufficient to detect whether those substances were actually present?—In some cases, yes; but generally speaking, no. I think you would not find that persons less qualified than educated medical or chemical inquirers would be competent to prove the presence of copper in pickles.

847. There are not, you think, any ordinary tests which could be applied by an ordinary person to the detection of those substances?—It would be unwise, I think, with the view of procuring evidence for legal procedure, to entrust chemical tests to persons who do not know the rationale of their application. The inspector of nuisances could scarcely be expected to have chemical knowledge, and to put a test into his hands to be used without chemical knowledge would seem an uncertain mode of proceeding.

848. Could not he be employed to a certain extent, and though his judgment were not conclusive, could not his report be referred to a higher authority?—The inspectors of nuisances in the City of London, where I know most about them, are men of about the level of masons' foremen.

849. The question does not refer to inspectors as they are, but to what would be practicable with a view of preventing the frauds complained of; we cannot have a chemical or a medical Board in every village of the country, but the question is, how we can check this system of adulterating food, so as to afford some protection to the poor. Could not there be persons, not of a very high grade, stationed in different parts of the country, to whom reference might be made where suspicion attached to articles which were dealt in of their being adulterated?—In some cases undoubtedly a very uneducated person could speak to the fact of adulteration, but not I think in all cases, nor in the majority of

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cases; but in every part of the country you have a poor-law medical officer who would be competent to do so.

850. The object of this Committee is to discover some arrangement which would be effectual for the purpose; they desire to know whether persons could be trained without any very expensive education, to advise the inspectors on these subjects. For instance, would the use of the microscope require a professional man in order to discover what things were present in such an article as coffee?—It might not be impossible to give that amount of technical expertness to persons not having a complete technical education; but, as I said, there is no spot of the country without its poor-law medical officer; in every union there are medical officers, and those medical officers are educated and have been examined in chemistry.

851. Viscount *Goderich.*] You consider that they would be competent persons to conduct the necessary analyses for the detection of adulteration, do you?—In a great many instances, they would be highly competent. As public attention is now only beginning to turn itself to the subject, there may be many districts in which at first they would not be highly qualified; but they certainly would be very much more qualified than the average laity.

852. Generally speaking, they would be likely to possess the necessary qualifications, or they would be able easily to acquire them?—Quite so.

853. Mr. *Villiers.*] The very apprehension of their analysis upon articles being referred to them would operate very powerfully to check adulteration, would not it?—Yes. They are educated in the use of the microscope, and in the application of chemical tests; and those are the great means of detecting adulterations.

854. For the purpose of conclusive evidence, or of any legal proceedings, you would perhaps advise that their report should be referred to some higher authority, before being admitted as evidence?—I think not, as a general rule; at any time a man may be hung upon their evidence. Take cases of arsenic-poisoning in the country; it very frequently happens that conclusive chemical testimony is given by one of those medical officers, evidence of the presence of arsenic, which convicts a man of murder.

855. There are some cases in which their evidence might be taken as conclusive, and other cases where it could not; could you distinguish those cases, supposing it were necessary to draw up a schedule?—Yes, I think so.

856. Mr. *Peacocke.*] As you think that poor-law medical officers would in most cases, at all events, be capable of making a trustworthy analysis, would they be the most proper persons to appoint as those chemical inspectors whom you have spoken of?—For a great part of the country, I have no doubt they would be the best attainable organs of that inspection.

857. I apprehend the chemical inspector ought at all events to have some knowledge of analysis?—Of course; but it would be hopeless to get a special analytical chemist in every small town or village of the country.

858. Would you go so far as to say that you think the medical officers of the poor-law unions would be the most proper persons, as a general rule, to be chemical inspectors?—That becomes part of a very large question as to what should be the sanitary organization of the country. I think the poor-law medical officers, generally, throughout the country, would be the best persons to act under the appointment of local Boards in matters relating to the public health.

859. They would be the most proper persons, scientifically speaking, would not they?—Of the existing elements in villages and in small towns they would at least be among the most likely persons.

860. Mr. *Moffatt.*] Is it necessary at present for the medical officers of the Poor-law Boards to be analytical chemists?—It is required for their appointment that they shall have passed certain examinations, and have gone through a certain course of education; instruction in analytical chemistry forms part of that education.

861. Is that instruction carried to a sufficient extent to enable them to decide upon all the various cases which are likely to occur with respect to the adulteration of food?—There would be differences among them; but looking forward to a period of 10 years after the laws against the adulteration of food shall have come into action, in my opinion they would form a very highly qualified class.

862. They would be educated up to their new duties?—Yes.

863. Mr. *Sheridan.*] You are no doubt well acquainted with the duties of medical officers under the Poor Law?—Yes.

864. Do you not think that the claims of their private practice and their public duties would very much interfere with those particular requirements you are now alluding to?—I of course assume that they would be properly remunerated by the local Board; and as I presume a Poor Law medical officer is willing to extend his means of earning a livelihood, I do not think he would object to this as one of such means.

865. Do you think he would have time for the purpose?—Yes.

866. Mr. *Swift.*] I apprehend the medical officer of a parish is the medical attendant of the greater part of the tradesmen of the town or village; would not you be imposing upon him a duty which he would rather not undertake?—I think that is a very serious difficulty; but the other duties likely to devolve upon him in the progress of sanitary regulation create a difficulty of the same kind. The necessity that he should give evidence in many cases of nuisance is an embarrassment of the same nature; and I do not see how that difficulty is to be escaped from, except by what I suppose will eventually be the arrangement of the country, namely, that the Poor Law medical service will be on the same footing as the Army and Navy services, and that there will be a set of public officers distributed through the country having no private practice, but attending entirely to the sick poor, and matters of public health.

867. Mr. *Wise.*] As those men mix a good deal with the poor, do not you think they would naturally have great opportunities of finding out whether articles of food were adulterated?—No doubt of it.

868. If there were such provincial officers, do not you think it would be absolutely necessary to have a court of appeal or a Central Board in the metropolis, to which any doubtful cases or cases of great importance might be sent up?—I think for some cases it might be desirable.

869. Will you allow me to read you a passage from Dr. Hassall's evidence. In answer to Question No. 280, he says: "The duties of the inspectors, I propose, should be to keep a watch upon all articles, and judge as far as they could whether they are adulterated or not, and that when they have a suspicion, or even without a suspicion, they should make purchases in the neighbourhoods for which they are appointed, put the date upon them, and the address of the person from whom the purchases were made, and forward them to the Central Board for their opinion, whether they were adulterated or not, so that their powers in that way would hardly be liable to abuse." Dr. Hassall proposes that in all or most cases the articles should be sent up to the Central Board, so as to prevent favouritism or abuse?—I think there would be serious difficulties in the Central Board having thus constantly to supply scientific evidence in aid of the legal proceedings of local authorities.

870. Mr. *Peacocke.*] Do not you think, more especially after the excitement which the appointment of this Committee has caused, that would be almost too much for a Central Board to undertake?—I think there would be great difficulty; I think the best service the Central Board could render would be in deliberating and advising on those general principles which would fix the public schedule of hurtful adulterations.

871. Mr. *Villiers.*] You would distinguish such cases of adulteration from adulterations which are noticed by the officers of revenue, would not you; every body would be interested in any given place in the food being pure; therefore, persons would themselves refer to those officers to ascertain if it were so or not, and the men's reputation and situations would be at stake if they made a false report?—Yes.

872. Whereas though there are persons who are bound to report to the Board of Excise if any fraud takes place, it is only the revenue which is endangered, and the persons in the place are not personally concerned in the matter?—Certainly.

873. *Chairman.*] Would you consider an apothecary or a dispensing chemist a better person to conduct analyses than a Poor-law medical officer?—In those localities where there would be difficulty in finding highly educated men, the dispensing chemist shares one roof with the grocer.

874. In those localities you would look upon the medical officer as being a superior person, and better qualified to conduct the analysis than a dispensing chemist?—Yes.

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875. In other cases, perhaps an apothecary might be even a better person than the Poor Law medical officer?—The Poor Law medical officer would be an apothecary; I am not surprised that our medical titles should be open to some misconstruction, but the Poor Law medical officer is, generally speaking, a licenciate of the Apothecaries' Company.

876. Do you mean to say that a surgeon is necessarily a licenciate of the Apothecaries' Company?—A poor law officer holds as a rule two qualifications; he is a member of the College of Surgeons, and a licenciate of the Apothecaries' Company; in respect of being a licenciate of the Apothecaries' Company, he is entitled to dispense drugs to his patients.

Sir *John Gordon*, called in; and Examined.

Sir *J. Gordon*.

877. *Chairman.*] I BELIEVE you are the Mayor of Cork at the present moment?—I am.

878. Your attention in that capacity as a public officer has been a good deal devoted to the consideration of adulteration?—Yes.

879. What particular adulterations have you investigated?—Flour particularly, and butter and wheat. Shortly after I came into office many complaints were made to me by people from different parts of the city of Cork of flour bought in a particular house. Latterly in consequence of the very high price of the loaf, the poor people have been in the habit of making their own bread; they buy what they call weights of flour, a weight of flour being 7lbs., and they pay from 10½*d.* to 1*s.* for it; 3½ lbs. of that will make the weight of a quartern loaf, so that instead of paying 10*d.* for the quartern loaf, they have it for about 6*d.* A considerable amount of fraud certainly results, in consequence of the high price of bread forcing the poor people to have recourse to that means. Very shortly after I came into office, my attention was directed to the flour which was sold to the poor people, and in one case particularly, very many were, I may say, almost poisoned from the nature of the flour which they bought; we instituted inquiries, and had the party in whose house the flour was sold summoned to my local court. There could have been no previous arrangement, because the persons who complained came from different parts of the city; I examined them all separately, and found that the material was so bad that it was producing very violent gastric affections, purging to a considerable extent, and sickness of stomach, and so on. After issuing a warrant for the man, he disappeared, and he has not come into the city since; but some of the people who sold flour, and particularly his foreman, who sold it under his directions, gave an account of the kind and description of flour it was; it was flour which had been warehoused in England for such a length of time that it had suffered decomposition; it became so bad that it could not be sold here.

880. Mr. *Villiers.*] Was this statement made on oath before you as mayor?—It was; the flour was sent over to Ireland, and it was there found to be unsaleable also, so bad was it. However, by mixing it with a certain quantity of pollard and a small quantity of sound flour it was sold in this state. I got a portion of it analysed by the most adroit chemist we have in Cork, who is connected with Queen's College, and he ascertained that the flour as imported was unfit for human use; the gluten was absolutely decomposed; the fecula was greatly deteriorated too, and altogether it was in such a state, that unless it had been mixed with pollard to dilute its effects, it could not have been used at all as a material for human food.

881. Mr. *Swift.*] Was any other ingredient found in the flour?—I apprehended at first there was some metallic matter in it, but on close analysis we could discover nothing of the kind; I suppose there was an earthy matter. There is in the neighbourhood of Cork an earth called barytes, and I apprehended, that from the deleterious effects on the parties, something of that kind might have entered into the composition of the flour; but I afterwards ascertained that this barytes was used as a material in paint; and there was no earthy or metallic matter, so far as I could detect, by analysis.

882. Mr. *Moffatt.*] Did you discover any other cases of a similar character?—Yes; I have been six months in office, and there is scarcely a week that some case does not come before me. There is a great deal of competition among the small class of millers. In the production of this cheap material for the poor, the person who sells the flour the cheapest obtains the largest amount of business.

883. Have

883. Have you had any other of those inferior and unhealthy samples analysed?—Yes.

884. Mr. *Villiers.*] How have you dealt with those parties?—I have summoned the parties to the court, and in many instances I have had the flour seized; we find it rather a sharp thing to break up a man's establishment. He may be very honest himself, but he buys the flour from the millers and retails it for his livelihood; and in some cases I did not like to break down a party, considering that exposure in a few cases would have a good effect.

885. How do you proceed in the detection of these cases?—We have a Market Jury struck every three months. The duty of that jury is to visit every place where food is sold, if they have reason to think there is anything improper in it. I have gone occasionally to corn stores, where I have found grain in the most awful state of decomposition; in fact it was so bad to the senses that I said there must be something in this more than mere vegetable matter; such turned out to be the fact; it suffered at sea, and a particular insect became so numerous in it, that when they died, it absolutely produced the smell of animal as well as vegetable decomposition.

886. How do you deal with those particular cases which are brought before you as chief magistrate; what do you direct with respect to them; is the case referred to the Market Jury on the particular occasions on which they sit, or do you employ some officer to analyse the bread?—I, myself, was the party who directed the analysis in the case I have spoken of; in consequence of the impression which was made, this man being obliged to leave the city, it had the best effect for a very considerable time; though cases have come before me every week, yet so far as I could see myself, the flour was not always so bad as the people wished us to believe; every man who sold cheap flour was supposed to sell very bad flour.

887. In all those cases, did you find the flour bad from the same causes?—No, not in all cases; there was one very extraordinary thing happened within the last six or eight weeks; there was sent up to me, from a neighbouring town about 20 miles off, a quantity of material which was imported from England in very large quantities by a miller; it was supposed to have been sawdust finely dressed up for the purpose of mixing with flour. I paid every attention to it, and by the microscope I detected, and my opinion was confirmed by others very conversant with the instrument, that it was the hulls of wheat, barley and oats which was so admirably well dressed up as to have all the appearance of pure flour.

888. You found the miller was in the habit of importing this?—Yes, so it was represented to me; he was out of my jurisdiction, and I could not take any cognizance of it.

889. Did you ascertain whether this was a matter which was used in Cork?—No, it was not; but it might have been imported into Cork afterwards in a manufactured state; I have never been able to ascertain that.

890. You never traced any of this mixture in the cases of bread which came before you in Cork?—No.

891. What were the other cases which did come before you in Cork?—The first case I gave the Committee was the strongest case; we took it for granted that the unfortunate people were not only robbed, but their lives were endangered; for a poor man who lived on such a thing as 2 lbs. of bread a-day, did not take in one-fourth of that amount of nutrition.

892. Had you any evidence of any ingredients being found in this bread, of a deleterious kind, which were purposely mixed with it to give it weight?—Yes, I consider bran to be of that kind; there was no metallic matter we could ascertain.

893. From the decomposed state in which this stuff imported from England was, it had an injurious effect upon the health of the people?—No doubt.

894. Besides its not having the nutriment of the flour which they had paid for?—Decidedly.

895. Mr. *Wise.*] What is the course which you have adopted in those proceedings; you say there is a Market Jury struck; is that under a local Act?—Yes.

896. What power have they of punishing those parties?—A man is fined 10*l.* in the event of selling improper food.

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897. You are aware of the Act of the 6 & 7 Will. 4., c. 37 ?—I am.

898. Do you know of proceedings having been taken under that Act?—Proceedings have been taken, but not in my time.

899. In your time virtually the Act has been inoperative ?—In my time those articles have been seized.

900. You know of no occasion on which proceedings have been taken under that Act of William the Fourth ?—No.

901. When there has been a complaint made to you, it appears you have not ordered an analysis to be made in all cases ?—No.

902. Should not the Market Jury, in all cases where a charge was brought against any person, have directed an analysis to be made ?—When this bread has been brought to me, I have ascertained from its taste and smell that the complaints were rather exaggerated, and I did not think an analysis necessary; in fact, I found it very difficult to get an analysis made to my satisfaction.

903. In those cases where you did not proceed against the parties, there was reason to suspect that the flour was adulterated, more or less ?—Yes.

904. Mr. *Villiers.*] Did parties raise the price of the article they sold after you had prevented that particular stuff you have mentioned from being sold as flour ?—Yes; the party I prosecuted was selling it at 10½ *d.* the 7 lbs. The general price immediately afterwards was 1 *s.* Indeed the mere circumstance of his selling so low proved to me that there must have been something foreign mixed with it. To show what poor people might do, I myself bought a quantity of wheat, and I ascertained that a small hand-mill, turned by a man, would turn out as much as 30 stone a day; and I had in my own family some bread made with the flour produced from this mill, which was palatable and cheap, fully as cheap as the miserable stuff which was sold by those parties. We wanted to establish some system of that kind in Cork, but there was not sufficient energy or perseverance among the parties to follow it up.

905. I presume if these people had not been taken ill you would have hardly heard of the circumstances ?—Certainly not.

906. They are chiefly indebted to your energy and vigilance for the detection of the fraud ?—Yes. The Market Jury is sworn in the collector's court; they are twelve in number. Lately I have so arranged them that every two jurymen take a ward, and I have allocated to me the particular inspection of the central ward.

907. Those men are not scientific men, are they ?—No; their duty is, when they have reason to think there is anything injurious exposed for sale, to call my attention to it, and have part of it sent to my office, and then the matter is investigated.

908. It is hardly your duty to submit those things to a chemist for examination ?—Certainly not; unless I am in doubt myself, and think it necessary.

909. There is some expense attending calling in assistance of that kind ?—Yes.

910. Without there being any fund provided for that purpose ?—We have no fund.

911. Mr. *Moffatt.*] Are the Committee to understand that in consequence of the discovery of the inferior flour the price of flour generally was raised from 10½ *d.* to 1 *s.* ?—The good flour was all along selling for 1 *s.*, but that which was deteriorated was selling so low as 10½ *d.*; and our poor are so really poor that they will travel the whole length of the city to save a halfpenny in the 7 lbs.

912. This man's flour was an exception to that of the fair dealers who were selling a sound article at 1 *s.* ?—There were other exceptions.

913. Not such as to constitute the rule ?—No.

914. That was the only sample of flour you have had analysed since you have been mayor of Cork ?—I have partially analysed other specimens. I could find nothing metallic whatever in them. I had reason to think there must have been some earthy matter, but I could not detect any.

915. *Chairman.*] Have you ever heard of an admixture of millet-seed with bread ?—Yes: there is every description of farinaceous matter mixed with flour. There is an Egyptian grain called dari, and that was imported in very large quantities at one time into Cork; that to a moral certainty was for the purpose of mixing with wheaten flour; they were able to sell that for 6 *l.* a ton, while the other was bringing nearly three times that amount. Pea-meal and bean-meal has been known to be mixed with flour also; those are all less nutritious than wheaten flour.

916. Mr. *Swift.*] Should you say that the adulterations generally occur with the wholesale millers, or with the retail tradesmen?—Partly with the wholesale millers, and sometimes with the retail tradesmen.

917. Have you had any cases of conviction before you of a wholesale miller?—No, not any.

918. You say that the course pursued is to seize the article?—Yes.

919. Do you impose a fine in addition to that?—That is the regular course of proceeding. I have not done so, because, in the case where I would have done it, the man escaped my hands.

920. You have had no case during your mayoralty in which you have fined any person or seized the goods?—I have seized the goods.

921. Mr. *Peacocke.*] Do you know of cases of adulterations which have been brought under the consideration of this market jury in which the parties have been prosecuted?—They invariably report to me if they have reason to think that improper food is exposed for sale. Some time ago a very large quantity of wheat from the Mediterranean was imported by a very extensive merchant; it was so bad that my attention was called to it; but I ascertained I could not seize it, because the man got over the difficulty by saying it was so bad that he would not sell it to be used for human food, but he intended to sell it as food for pigs.

922. In the Act under which the Market Jury is appointed, is it prescribed that the Market Jury shall only make a report, or are they to prosecute?—They cannot prosecute.

923. Then they are, in short, strictly following the line of duty prescribed to them in reporting to you?—Precisely.

924. Mr. *Gregson.*] Is this Market Jury established in Cork only, or in other towns in Ireland?—I do not know.

925. *Chairman.*] Are there any other articles which you have found to be adulterated?—I saw latterly a very large quantity of butter which was brought to me; in that case it was seized and destroyed. It appeared to me to have been merely curds mixed with a certain quantity of butter; it was made in the neighbourhood of Cork, and brought in in firkins.

926. This was a case brought before you, was it?—Yes; I had it seized and destroyed.

927. Mr. *Sheridan.*] Was that sold at the price of good butter?—It was sold at the price of good butter; the party who bought it detected the fraud which was committed on him, and he reported it to me. I made the party pay back the money he received, and had the butter destroyed.

928. Mr. *Villiers.*] How did the person discover it; was the butter subjected to any chemical analysis?—No, I was only able by the microscope to ascertain the fraud; it is very hard, by chemical analysis, to satisfy yourself on the subject. I think the microscope is the preferable mode.

929. Did you inquire if any of those persons had been in the habit of supplying such butter to the town?—That was a particular case; butter is a principal article of trade in Cork. The small farmers in the neighbourhood, who cannot fill a cask, send in 18 lbs. or 20 lbs. at a time, and this is bought by parties who afterwards cask it when they have a sufficient quantity. This butter was manufactured in this kind of way; 18 lbs. or 20 lbs. of it was sent in at a time, for the purpose of its being casked and brought into the regular warehouse, and in transferring it from the small cask into a larger one the party discovered it was so bad that he reported the matter to me.

930. Who was it discovered it?—One of the men who trade in that kind of way; who buy small quantities of butter for the purpose of making it up in casks.

931. He might have discovered the deception at any time before?—He might.

932. This is an exceptional case of detection, therefore?—It is; but I am convinced that butter is occasionally mixed with foreign matter.

933. Do you know what materials those are which the butter is mixed with?—I have heard of a strong paste being used.

934. Are you giving us the result of any inquiry of your own?—No, I am speaking only from hearsay, and what I believe from an inspection of the material.

935. Do you know anything of the butter which is exported from Cork to England?—Yes.

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936. Do you think there is any paste in that?—No; it undergoes a very accurate inspection by regular inspectors at Cork.

937. Viscount *Ebrington.*] Does the Cork butter bear a better price than butter from other places, in consequence of the inspection?—Yes.

938. Does it fall within your knowledge that buyers are willing to pay something more for the sake of security as to the genuineness of the article?—Yes; the butter is sold as firsts, seconds, and thirds. I believe the market is supposed to be the very best in the United Kingdom; they are so particular in the examination of the article.

939. Mr. *Villiers.*] There was no question as to your authority for destroying this butter when its quality was made known to you?—None; the party at once submitted to have the butter destroyed.

940. Is there any other article which you have discovered to be adulterated?—I happen to have seen a quantity of coffee which appeared to me, on making it, to have a very large proportion of bread, crusts of bread which had been ground up, and exhibited all the appearance of real coffee. I saw that myself.

941. You are a chemist yourself, are you?—Yes, I am. My attention was particularly attracted to that in consequence of its being sold so much cheaper than coffee in respectable houses.

942. What other material did you find besides crusts of bread?—Only crusts of bread and pure coffee.

943. Did you find any chicory?—There might have been chicory in it; but I did not detect it.

944. Roasted corn?—I believe roasted corn sometimes enters into the adulteration of coffee, but on this occasion I found only crusts of bread.

945. Is coffee much drunk by the poor in Cork?—No; they generally have recourse to tea.

946. Can you give the Committee any information upon the article of tea?—I cannot speak positively to it; but I know that an article which is sold very cheap, as some descriptions often are, must have some kind of fraud practised on it. The people rather look to the colour than to the flavour of their tea.

947. Have you any reason beyond hearsay for believing that adulterated tea is sold in Cork?—None; I am generally led to think that matters cannot be right where they are sold so much under their standard price, but that is all; I have ascertained, in fact, that the bread, particularly, which is sold in all the respectable houses, not only is bread made of proper wheaten flour, but is of the full weight; but that is not at all the case where it is sold cheap to poor people; the poor are invariably the victims in all cases.

948. Are there any other articles which as a chemist you have made the subject of inquiry; the article of milk, for instance?—I almost daily seize on pails of milk, in the winter particularly; it is very difficult to act with the lactometer in the summer; it is not a very accurate instrument; if the milk is very rich, it will produce very nearly the same effects on the lactometer that it will if it be very poor; if you dilute milk with a certain quantity of water it will give you nearly the same specific gravity as if it is rich in cream.

949. Then this instrument is of no use?—It is not at some particular seasons; in summer I can never trust to it.

950. You have constant complaints about the condition of the milk, have you?—Yes.

951. What is the complaint?—The complaint is that it is bad; that in fact it is sour, though sold as new milk, and that it is diluted with water to a very considerable extent.

952. What have you done upon these occasions?—I have seized it.

953. What proof of the charge have you required?—The lactometer is used, and the market jurors are so very adroit that I very seldom find them to be mistaken; so sure as they say that it is adulterated with water, I find it to be so on using the lactometer.

954. Is there anything else put into milk?—No; I think it is a mistake to suppose there is any chalk in milk; you may make cream by means of arrowroot and so on.

955. *Chairman.*] Would not arrowroot be as expensive as the cream?—No; an ounce of arrowroot of the value of $1\frac{1}{2}d.$ will make about three pints of a fluid as thick as cream.

956. Mr. *Villiers.*] Would you say that these frauds are practised to an extent

extent as to be a grievance to the people?—Since I became Mayor of Cork I have satisfied myself that adulteration is practised to a fearful extent, and that unless some stop be put to it, it is impossible to say what the consequences may be.

957. As injurious to health, do you mean?—Yes.

958. And it also acts as a fraud upon the people, inasmuch as they pay for things they do not get?—Yes.

959. Mr. *Peacocke.*] Is not Cork a great port for the exportation of flour?—Yes.

960. You have told us that there are inspectors for the inspection of butter; are there also inspectors to examine the flour which is exported?—No.

961. You said you had every reason to believe that the great millers do adulterate their flour?—Yes; but I am rather disposed to think it is not done for this market; it must be for the home market. They get the proper price in England; but the great competition among the poor causes them to send into the home market a very improper material.

962. The same principle would almost apply to the corn which is exported, would not it; they would get so much larger profits, by adulteration?—I have not heard of the flour which is exported being complained of; I know that with the view of producing a very fine wheat flour they have tried a number of bleaching ingredients, and among others a kind of acid. I have known respectable men in the milling trade to experimentalise with acids; they have sprinkled acids on the corn before it is kiln-dried, with a view of producing as white a material as possible.

963. Are those acids which are so employed prejudicial to health?—I should suppose not.

964. Mr. *Swift.*] Is that practised upon inferior flour to make it whiter, so as to enhance the price?—Yes; there are both red and white wheat in the market; and with the view of making the red wheat as nearly like the white as possible these materials are used.

965. This adulteration is not prejudicial to health, but is adopted as a fraud in order to obtain a higher price for inferior flour?—Yes.

966. Mr. *Gregson.*] You said that unless a stop were put to these adulterations, they would interfere very much with the public health; how do you propose to put a stop to them?—I think the authorities are not as vigorous in the matter as they ought to be; I think it is the duty of the chief magistrate to attend to the interests of the lower orders, but I am sorry to say that is not generally done; I think in all cases where the magistrate has reason to think an inferior article in the way of flour, or anything of the kind, is sold in a particular house, he has a right to satisfy himself positively upon the subject, and I think there should be some easy means of doing so. It is totally impossible, except after very considerable delay; and even with the materials at hand it is very difficult to ascertain the exact ingredients contained in flour or any matter of that kind.

967. You said you seized adulterated articles; do you impose a fine in addition to seizing the articles?—Yes; I should do so. In the case I have mentioned I did not do it, because the party ran from under my jurisdiction altogether.

968. Do the same parties come before you again after being fined and having their goods seized?—No.

969. That puts a stop to the practice?—Yes; the article of flour is certainly improved in consequence of my having made public the circumstances which came to my knowledge.

970. Mr. *Villiers.*] Have you discovered a regular trade to be carried on between Cork and some parts of this country in this deteriorated flour?—I have discovered it latterly; I was not aware of it before.

971. You found it was a pretty regular business?—I heard of it from the very parties themselves. There was one description of flour so bad, that it could hardly be used for any purpose.

972. Did that come from London, or from other parts of this country?—I think it came from Liverpool.

973. Do you suppose it was English flour?—Evidently so.

974. It was not imported from anywhere abroad?—No.

975. Is there anything else you wish to suggest to the Committee upon the subject before them?—I am not aware of anything.

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976. Mr. *Gregson.*] You say these adulterations are most conveniently detected by the microscope; what is the size, and the price, of such a microscope as could be used for domestic purposes?—The one I use was given to me by a scientific man; I think it cost originally about 20 *l.*; you would get one, I dare say, for 15 *s.* or 20 *s.* that would do.

977. Mr. *Peacocke.*] You are a medical gentleman, I think, yourself, and therefore, in the case I referred to, you can examine the flour, or whatever may be in question, with the microscope; but suppose the mayor of Cork was not a medical gentleman, he would have to call in some medical gentleman, and would have to pay him?—There is no fund for the purpose.

978. Mr. *Swift.*] The Market Jury are an unpaid body, are they?—Yes.

979. Mr. *Peacocke.*] Unless the mayor of Cork happened to be a medical gentleman, or in sufficiently affluent circumstances to take upon himself the expense of submitting articles to the examination of a medical gentleman, there would be no remedy?—None.

980. Mr. *Gregson.*] What becomes of the fines which are levied?—They go to a variety of purposes; among others, there is a class of human beings who die, and there are no means of burying them, except what are obtained from the police office.

981. Mr. *Swift.*] Is butter the only article which is subjected to inspection when it is exported?—I do not recollect any other article.

982. Is there any law which renders it compulsory that butter should be subjected to inspection when exported?—There is.

983. But it only applies to that article?—That is all.

984. Do you think the inexpensive course you have pursued has tended to arrest the progress of adulteration of all articles in the City of Cork?—I think adulteration is not carried on to the same extent it was, and I am quite convinced if the attention of the authorities continues to be directed to it in that way, the practice will be greatly lessened.

985. Mr. *Villiers.*] What do you know respecting the adulteration of drugs?—I invariably take it into my head that, when I see an article offered for one-half its intrinsic value, there is something wrong about it. I have known opium, the effects of which are so very salutary in many cases, offered, even in respectable houses, for a vast deal less than its intrinsic value; and I have no hesitation in saying that that is a compound of mixed extracts of liquorice and gentian with pure opium; it is so diluted as that it contains one-half of foreign matter; I mean matter which is not opium.

986. Have you found it so?—I have not entered into a minute analysis on the subject.

987. You say drugs are adulterated?—No doubt of it.

988. Can you speak, from your experience as a medical man, that where you have prescribed certain remedies, from the drugs being adulterated, they have not had the intended effect?—I am particularly circumstanced, for I am a dispenser as well as a prescriber, and I do business with the most respectable houses; but I have known medical men greatly disappointed in the effects of their remedies.

989. Owing to the drugs not being pure?—Yes. The article of morphia is an expensive one, and there is no doubt that that is very constantly mixed with powdered opium, which is about one-fourth the strength only; consequently if you give a quarter of a grain as a full dose, you are completely out in your calculation.

990. Mr. *Swift.*] With whom does the adulteration of drugs occur?—There is a class of men in this country called grinders; they are the men who produce the powder from the raw material; and it is a well-ascertained fact that in very many instances drugs are greatly adulterated by them.

991. *Chairman.*] Do you know the article of Gray powder?—Yes.

992. That is in very common use, is not it?—It is.

993. Suppose it did not contain more than one-half the proper quantity of mercury, you would consider that a very large adulteration?—Certainly; Gray powder is a combination of chalk and black oxide of mercury. Scammony is a drug which is very much adulterated; it is an efficient medicine if pure; but from its high price it is constantly adulterated.

994. Do you know what the adulteration generally consists of?—They say common resin.

995. Mr. *Villiers.*] Where is it adulterated?—Both here and abroad.

996. Mr. *Peacocke.*] Independently of what takes place at the grinder's, I suppose at Cork, as at other places, drugs are adulterated?—I believe very little in Cork; in the first place, they are not adroit enough to do it, and next, the quantity sold in any one house would not induce them to embark in anything of the kind.

997. Do you think the poor are more exposed than the rich to the supply of adulterated drugs?—I know that most Boards of Guardians for economy sake very often take the lowest tender, and many articles which are contracted for are not absolutely paid for by one-half. I mean that an article the value of which is 1*s.* per lb. is constantly in those contracts put down at 6*d.*; therefore it must be a deteriorated article; even if they do not adulterate the articles themselves, those who are chemists, who obtain the contracts, deal in London with inferior grinders.

998. *Chairman.*] Is not the article of calomel very frequently adulterated?—It is.

999. The specimen before me, which is sent me by Mr. Donovan, of Dublin, is said to be adulterated with chalk; do you think that is a common adulteration?—I do not think it is. The adulteration of drugs by metallic substances is very easily detected by the chemist.

1000. Mr. *Sheridan.*] By whom are the chemists in Cork generally supplied with medicines?—I do not know; every man has his own particular wholesale house.

1001. Mr. *Swift.*] Do they derive their supplies from Cork, or from London, generally?—From London.

1002. The chemist, I suppose, is perfectly aware when he is getting in his supplies, of any adulteration which exists in the articles he purchases?—He ought to be so.

1003. Mr. *Moffatt.*] Are there any direct importations of drugs to Ireland from foreign parts?—I am rather disposed to think there is not.

1004. Mr. *Villiers.*] There is no real economy, is there, in the guardians contracting to be supplied with drugs at so low a rate as to make it probable they will be adulterated; it is bad economy, is not it?—Wretched economy.

1005. The poor are not cured, but they remain sick in greater numbers than they would otherwise do?—Certainly.

1006. Mr. *Swift.*] Is it the custom for the medical officers in Cork not to supply drugs themselves; in this country the medical officer generally supplies his own drugs?—You have a medical officer whose sole business is that of prescribing and attending the sick; and in addition there is a resident apothecary, and there is the druggist, who sells the drugs to the establishment. You have an apothecary in the establishment, resident, for the purpose of compounding; you have a physician, who is seldom resident, but who is a practitioner in the town or city, and who goes there once or twice a day, and prescribes; then there is the druggist in the town, who sells medicines, and sends them to the establishment.

1007. Mr. *Gregson.*] Does not the resident apothecary examine the drugs, and reject them if adulterated?—He should do so; and I have known him report very constantly of the inferiority of the articles, but still there is always a party in favour of the article.

1008. Mr. *Peacocke.*] Are you speaking only of Cork, or of Ireland generally?—Of Ireland generally.

1009. Mr. *Villiers.*] Do you think it is of importance enough, and do you think adulteration is general enough to make it necessary that some public officer, like an inspector, should be appointed in the City of Cork for the purpose of ascertaining whether food is wholesome, and who could be referred to on a suspicion of its being otherwise?—I think there ought to be an inspector in every city of a certain population.

1010. What is the population of Cork?—Between 90,000 and 100,000; and there is a very large district round it.

1011. You think at first he would have occupation enough?—Yes; but I think the matter would be remedied after a time, though at the time of starting a moderate salary would be quite sufficient.

1012. Particularly if he remained on the spot?—Yes.

1013. Is there any other remedy which you can suggest for this wide-spread and general evil?—None other occurs to me; I am quite convinced that legislation ought to step in and remedy the evil; it is getting to such a pitch.

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1014. How long have you known Cork?—I have lived there from the age of 14.

1015. Is it only of late years that you have suspected this adulteration to be so general?—Since I became mayor. People have given me the credit of being scientific, and that was the reason I was particularly appealed to. It is only since the 1st of January last that my attention has been particularly directed to the subject; I obtained Dr. Hassall's book the instant it came out, and I think it is a work which is likely to be of the greatest possible use.

1016. It had not attracted the attention of particular parties before?—I never heard of flour having been detected in Cork as being bad before.

1017. Mr. *Moffatt.*] Your attention, as a medical man, had not been previously drawn to this subject of adulteration?— Precisely so.

1018. Mr. *Villiers.*] Would the same observation apply to drugs?—All expensive drugs are, in many cases, deteriorated; that is a very old complaint.

John Mitchell, Esq., called in; and Examined.

J. Mitchell, Esq.

1019. *Chairman.*] ARE you by profession an Analytical Chemist?—I am.

1020. You have, I think, published some work on the subject of the adulterations of food?—I have.

1021. I need not ask you whether your experience goes to show that there is a very extensive adulteration carried on in the leading articles of food?—Nearly every substance consumed as food is adulterated more or less.

1022. Mr. *Villiers.*] Are you speaking of London?—More particularly.

1023. *Chairman.*] When was your attention first directed to this question?—About eight or nine years since.

1024. Did you commence any system of analysis at that time?—Yes, I did; I did so with a view of obtaining materials for the work I intended to publish on the matter.

1025. After how many years' experience did you publish that work?—After three years' experience.

1026. Will you state to the Committee what are the principal articles you have found to be adulterated?—Bread is very considerably adulterated with alum and boiled potatoes, and with inferior flour.

1027. Is it absolutely essential that any quantity of alum should be mixed with the bread?—For the improvement of the appearance of the bread; it renders it whiter; most home-made bread has a yellowish tinge; alum removes that.

1028. Is there any flour in this country which would be comparatively useless if alum were not mixed with it?—Not if in good condition.

1029. Any flour which required the admixture of alum you would consider to be in an unfit state for food?—Decidedly so.

1030. Mr. *Villiers.*] Do you know that that is the reason why alum is mixed with flour; that the flour is in an unfit state for use?—It is not always in an unfit state; that is to say, the flour may be only partially bad; but it is used in every case.

1031. What is your experience as to the quantity of alum which is used in admixture with flour?—I have found as much as from 90 to 116 grains in a 4 lbs. loaf.

1032. *Chairman.*] Is that an injurious quantity?—Decidedly; any addition of alum is injurious; the constant use of even a small quantity of such an astringent as alum must necessarily be injurious.

1033. Mr. *Villiers.*] This is the result of a great number of experiments, is it?—I have examined some hundred samples of bread from different parts of the metropolis.

1034. Taken promiscuously?—Yes; taken from the higher neighbourhoods as well as the lower.

1035. You found that to be the most usual ingredient in the adulteration of bread?—Yes; that and potatoes.

1036. Is potato used for the same purpose?—No; it causes the bread to carry more water after baking.

1037. In what state is the potato when it is used?—It is boiled and mashed to a pulp.

1038. Need they be good potatoes, or may they be potatoes which would not otherwise

otherwise be used?—I think potatoes which could not be well used otherwise, could not be well employed for that purpose.

1039. Mr. *Sheridan.*] What quantity of potatoes would there be in a 4lb. loaf?—That I can scarcely say; I have not made any absolute experiment, but I think something like one-twelfth possibly of the wheat flour.

1040. Did you hear the result that Dr. Hassall arrived at; that the introduction of potato into bread was for the purpose of fermentation, to add to the power of the yeast?—I scarcely see how it could have that effect.

1041. Mr. *Moffatt.*] Are the Committee to understand from the statement you have made, to the effect that there are from 90 to 100 grains in a 4lbs. loaf, that that was the average quantity of alum you found?—No, that was the utmost; the smallest quantity I found was from 15 to 20 grains.

1042. What may be taken to be the average quantity of alum you found in a 4lb. loaf?—The average quantity must be about 40 grains.

1043. Mr. *Villiers.*] What are the effects upon the stomach of alum?—I am scarcely medical man enough to answer that question; it must be evident that the continual use of any astringent must be injurious.

1044. That is the property of alum, is it?—It is.

1045. Mr. *Peacocke.*] The practical effect of the use of potato is, that it makes a 4lb. loaf heavier, and therefore there is less nutriment in it than if only flour had been employed?—Yes, precisely so.

1046. Have you found any marked difference between loaves bought in the poorer districts and in the wealthier districts?—No, they seem to be much alike.

1047. Mr. *Swift.*] Did you obtain your samples from the high-priced bakers, or from those who sell second quality of bread?—From both.

1048. Did you find the same amount of adulteration?—Very much the same.

1049. Mr. *Villiers.*] Have you found anything else in bread; have you ever found bones?—That adulteration is usually practised by millers in the flour; the only additions made I believe by bakers, are those of alum and boiled potato, with the exception of a little carbonate of ammonia, occasionally.

1050. Have you also inquired into the state of flour?—I have.

1051. What have you found in that?—I have found sulphate of lime and chalk; those are the two chief earthy ingredients I have found.

1052. Are those for the purpose of giving bulk only?—For the purpose of increasing the weight of the flour.

1053. Are they very cheap?—Much cheaper than flour.

1054. How have you ascertained that adulteration; have you actually got the flour from the miller?—No, not from the miller.

1055. It is from the retail tradesmen you have had the flour?—Yes; I have not obtained any directly from the miller.

1056. The baker does not get his flour cheaper in consequence of those materials being used, does he?—I am led to believe he does so, and that he does know of the adulteration.

1057. Could he readily detect it?—Any considerable addition might be readily detected, by merely igniting the flour.

1058. Do you believe that the millers supply the bakers with flour at different prices, and that there is some sold at so low a price, that the baker ought to suspect that it is not genuine?—Yes, precisely so.

1059. What is the object of the introduction of sulphate of lime?—It is merely to depreciate the value of the flour.

1060. Have you ever found ground bones?—I have not found any; I have understood that such a substance has been used.

1061. Would you say its use was general?—Yes.

1062. And you have taken flour promiscuously as you have bread, in the way you described just now, and it had those substances very generally in it?—It had.

1063. Have you found anything positively deleterious in bread, except alum?—No.

1064. And you are speaking of the bread which is ordinarily sold?—Bread which is ordinarily sold.

1065. Do you know, with respect to brown bread and rolls, whether they are adulterated?—I have only examined rolls; I have not examined brown bread.

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1066. Are rolls adulterated the same as other bread?—Yes, precisely.

1067. They are not the same colour as the usual quartern loaf?—No; but the same additions are made.

1068. You found every variety of amount between 15 grains of alum and 100?—Yes.

1069. *Chairman.*] Have you examined any unfermented bread?—I have not.

1070. Are you aware that German yeast is used in making bread?—Yes.

1071. Do you know what German yeast is, and do you consider it a very proper admixture with bread when it is pure?—Yes; I see no objection to its use.

1072. Have you seen any which is not pure, or in an unwholesome state?—I have never met with any in that state.

1073. Mr. *Villiers.*] What is the next article which you think of importance to bring before the Committee which you have examined?—Beer is an article which is considerably adulterated.

1074. *Chairman.*] What are the principal adulterations in the case of beer, distinguishing, if you please, between porter and stout and ale?—One adulteration, which is common to all beer, is the addition of water; the next is the addition of sulphate of iron and alum and common salt; those more particularly apply to porter and stout.

1075. Mr. *Villiers.*] Why do they put alum in porter?—Alum and sulphate of iron are used together to give a head to the porter.

1076. What is the effect of sulphate of iron, and in what proportions have you found it?—The proportions are but small.

1077. Is it pretty generally used?—It is pretty generally used.

1078. What is its effect upon people generally?—It would act much in the same way as the alum, as an astringent.

1079. It does not give any intoxicating effect to the beer?—No; it only gives this apparent strength in the heading upon the beer.

1080. *Chairman.*] Have you found any article mixed with porter the tendency of which is to give an intoxicating character to it?—No, I cannot speak from actual experience. I believe cocculus indicus and some other matters of that kind are employed for the purpose of increasing the intoxicating power of porter.

1081. Is it possible to detect those substances by chemical analysis?—It is; but it would be a troublesome inquiry, and even then I do not think an analysis could be pronounced perfectly to be depended on.

1082. Mr. *Peacocke.*] It might be present without your detecting it?—Precisely.

1083. Mr. *Villiers.*] Are you a medical man?—I am not.

1084. You are not able, perhaps, to speak of the effect of those articles you have found?—No.

1085. Are you able to say whether the effect of those ingredients has been to produce colic and vomiting, and when in very large proportions they have had the effect of poisoning?—I dare say they will produce the effect of poisoning; whether they would produce colic and vomiting I cannot say.

1086. Are ales adulterated with the same articles?—They are also stated to be adulterated with cocculus indicus and grains of paradise.

1087. What are grains of paradise used for?—For giving pungency to the ale.

1088. That is injurious to health, is not it?—No, I do not think that is an injurious addition.

1089. Are not chemists forbidden to sell it?—They are forbidden to sell it to brewers or to a brewer's agent.

1090. Do you mean to say that a chemist, known to have sold it to a publican, would be liable to a penalty?—He would be liable to be fined.

1091. That is easily evaded, is not it; he need not sell it to the publican; he can sell it to the publican's friend?—Precisely; I believe it is in that way these things are sold.

1092. Then, as the law exists, it is no check to fraud?—None.

1093. *Chairman.*] Is there not a class of persons called brewers' druggists?—I have no doubt there are persons who have made a trade in dealing in those things.

1094. Mr. *Villiers.*] Where have you got your samples?—From public-houses and from breweries.

1095. What

1095. What are the adulterations used by the brewers?—I do not believe at the large breweries there are any adulterations; I think it would be impossible to carry on adulteration where so many men are about; in small breweries I believe adulteration is practised to a very considerable extent.

1096. Are not there frequently informations laid against brewers?—Yes.

1097. What are they for generally?—For having gentian and grains of paradise and such matters in their possession.

1098. Have you ever been employed by the Excise?—I have not.

1099. Mr. *Sheridan.*] Have you detected sulphate of iron in every sample of beer you have analysed?—In nearly every sample of porter.

1100. Mr. *Villiers.*] Have you found sugar occasionally?—That you cannot well determine; there is always a certain amount of sugar naturally existing in beer; molasses and sugar are now used by brewers in lieu of a certain proportion of malt; that is no adulteration, because alcohol is produced just as it would be from the sugar existing in malt.

1101. Is your experience very extensive with respect to beer; have you examined a great many samples?—I dare say I have examined 200 samples at different times.

1102. Have you found any pure?—Yes.

1103. Sold at a public-house?—No, from the brewers.

1104. You have not found any pure which was sold at the public-house?—None at all.

1105. And each of those 200 samples contained sulphate of iron?—In all those cases where I have procured beer from the public-house.

1106. Mr. *Peacocke.*] Did you buy at public-houses in different districts?—Yes.

1107. In the less wealthy districts did you find the beer more or less adulterated than in other districts?—I think it is about the same.

1108. Mr. *Villiers.*] There are different prices charged for the same article; you will see beer at one house sold at 3 *d.*, and at another at 4 *d.*; have you ever examined those beers to see which was most adulterated in reference to the price?—Not in reference to price; I have only examined it as a sample of beer, to see whether it was adulterated or not.

1109. Does the difference of price afford presumption that there is adulteration?—When the price is very low we have every reason to suspect there is adulteration, though I believe the publicans could very well sell their beer at a low price without adulteration.

1110. Mr. *Gregson.*] You mean they can get an ample profit without adulteration?—Yes.

1111. Mr. *Villiers.*] Does not that depend upon the terms on which they hold the houses in regard to the brewer?—Yes; supposing a fair price is charged by the brewer, the publicans ought to be able to sell their beer at the lower rate.

1112. You do not know that these adulterations take place with a view to meet the taste of the public; you do not think they are for the purpose of providing an article which the public prefer?—That may have some influence; it was at first introduced, no doubt, for the purpose of extra gain on the part of the sellers.

1113. There cannot be a doubt that there must be an additional profit, when water is sold in such a large proportion, instead of beer?—Certainly.

1114. Have you found gin very much adulterated?—Yes, but more particularly with water; it is rather a reduction in the strength of it than anything else.

1115. Have you found any cayenne pepper in gin?—I have not.

1116. Mr. *Gregson.*] Perhaps you would not consider the reduction of its strength an injurious matter, as regards the health of the community?—The consumer would rather reduce it for himself, I presume.

1117. *Chairman.*] Can you name any other article of general consumption which you have found to be adulterated?—Coffee.

1118. Does the result of your inquiries correspond with those of other gentlemen who have given evidence here upon that matter?—Yes, entirely.

1119. Did you find a large proportion of chicory?—Yes.

1120. And very generally sold for coffee?—At nearly every grocer's; I have only obtained a very few samples of pure coffee, when bought ground.

1121. Are you speaking of that which you buy as coffee?—Yes.

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1122. Do you think the retail dealer can be imposed upon himself?—I do not think it very likely, because most of the grocers grind their own coffee previously to sale; it is not bought in a ground state.

1123. Have you found that grocers generally grind their own coffee?—As far as my knowledge goes.

1124. Tell us exactly what you have found in any samples of coffee you have examined?—I have found chiefly chicory, roasted corn, roasted roots of other kinds than chicory, and sometimes inorganic matter, such as earth, ochre, and so on.

1125. How have you detected those ingredients in coffee?—By the ordinary chemical tests.

1126. We have heard of the microscope and other tests; which have you used?—I have entirely used chemical tests.

1127. How have you detected chicory in coffee?—Chicory and coffee differ very much from each other in their effects upon water. Supposing genuine coffee is sprinkled upon the surface of a tumbler of water, it remains a considerable time floating, and when it sinks it only slightly colours the water; chicory, on the other hand, sinks quickly, and colours the water very deeply.

1128. You do not believe there is any ingredient in coffee itself, or anything which is naturally found in coffee, which can be mistaken for chicory?—No; ground coffee is enveloped in an oily substance which prevents the water attacking it; chicory has no such protection, and sinks immediately.

1129. Do you think that any chemist could possibly be mistaken in reporting upon the mixture of chicory with coffee?—I think not.

1130. It is so easy of detection?—Very easy indeed.

1131. *Chairman.*] You look upon the circumstance that grocers grind their own coffee as being a complete protection against fraud upon them?—Yes.

1132. Are you aware that there is an article made which is a precise imitation of the coffee-berry, but which is not coffee?—I have heard so; I have never seen it.

1133. Mr. *Villiers.*] Have you examined cocoa?—I have.

1134. Is that pure?—No; it is adulterated very considerably with starch and with ochre.

1135. Can you state the proportions in which you have found it adulterated?—I cannot; I made no quantitative estimates of those materials; I simply ascertained their presence, and they appeared to be present in considerable quantities.

1136. Cocoa is much more consumed now than it was, is not it?—Yes.

1137. Would you say that it would answer to adulterate cocoa from the price?—Yes, no doubt about it.

1138. The articles you speak of are of very little value?—Very little in comparison to the price of cocoa.

1139. Are those articles easy of detection?—The ochre is, but not the starch.

1140. Why should not starch be readily discovered?—Because starch already exists in the cocoa bean itself. The microscope would be the best means of detecting that.

1141. Mr. *Peacocke.*] The ochre would be employed to colour the starch to the colour of cocoa?—Yes, and to increase the weight of the cocoa.

1142. Mr. *Villiers.*] Have you examined many samples of cocoa?—Two or three dozen samples.

1143. Taken from different places?—Yes, different places.

1144. And from different kinds of shops, both large shops and small?—Yes; the whole of the samples I have examined were obtained in that way.

1145. Have you ever found any pure?—Yes.

1146. In the majority of cases what have you found?—In the majority of cases I have found ochre.

1147. And you have really found no difference, whatever might be the character of the shop?—None whatever.

1148. Mr. *Gregson.*] Does cocoa come to the hands of the grocer in a manufactured state?—Yes; the bean has been roasted, and ground and prepared, when it reaches the hand of the grocer.

1149. Mr. *Villiers.*] You are aware that great progress has been made in the means of detecting those adulterating substances?—I am.

1150. Are you aware that in the year 1851 a report was made to the Chancellor of

of the Exchequer, that four eminent persons had been employed to detect the adulteration of coffee with chicory; but that "neither by chemical tests, nor by any other means, was the admixture of chicory with coffee to be detected"?—At that time there were just the same means of detecting chicory that we have now.

1151. Were they known?—Yes.

1152. When did you begin your inquiries?—My work was published in 1848.

1153. So that, if you had been referred to, you could at once have told them that that was not the case; that we were not in such a helpless state, but that it was possible to discover the presence of chicory?—Most decidedly.

1154. Mr. *Gregson.*] What is the title of your book?—"On the Adulteration of Food."

1155. Mr. *Peacocke.*] Have you generally found any marked difference in articles sold in shops where the poorer classes are likely to deal, than where the richer classes are likely to deal?—No; I found the adulteration general.

1156. You are probably aware that a great many public-houses belong to certain large brewers; did you find that they sold purer malt liquors when under the influence of those large brewers than others?—Not at all; the adulteration takes place, I believe, by the publican.

1157. Mr. *Villiers.*] Can you state anything respecting tea?—Yes; that is also extensively adulterated with other leaves, such as sloe and hawthorn.

1158. Can you speak from the result of experiments which you have made yourself?—Yes.

1159. Were you here when Dr. Hassall was examined?—No.

1160. He has stated that he has very seldom found any leaf of a British plant in tea. You say you have ascertained that sloe-leaves and hawthorn-leaves are used?—Yes.

1161. How have you ascertained it?—By comparing the behaviour of leaves of that kind taken from the tree, with certain re-agents, and then that of the tea-leaf. I have found marked differences between the behaviour of the hawthorn and sloe-leaf, and that of tea.

1162. That only shows there is a difference between what you have examined and tea; how have you come to the conclusion that it was the sloe-leaf which was used?—By the leaves, which did not behave in the same way the tea-leaves did, behaving in the way I have found the sloe-leaf and the hawthorn-leaf to behave.

1163. Did you examine many samples of tea in which you found sloe-leaves to be present?—I have examined seven or eight samples taken from shops in London in which I detected them.

1164. What is the advantage of using the sloe-leaf?—It is a cheaper leaf than the tea-leaf; it has to pay no duty.

1165. Has it any flavour or anything which is calculated to mislead the consumer?—It has not exactly the flavour of the tea-leaf, but when mixed in small quantities the adulteration is not perceived.

1166. It is never sold exclusively as tea, you think?—I have never met with a sample of the kind.

1167. Is it innocuous?—It is quite so.

1168. Have you ever found earthy matter in the tea which is sold in London?—Only in that which is called the "facing" of the tea.

1169. You do not know of teas which have a certain proportion of earthy matter, which are sent here from China in that state?—Yes, but only existing in the "facing."

1170. *Chairman.*] You do not know of such an article as lie tea?—I have heard of it, but have never seen it.

1171. Mr. *Villiers.*] Have you examined more than seven or eight samples altogether?—I have examined a great many more than seven or eight samples; only that number have I found adulterated with sloe-leaf.

1172. What else have you found besides sloe-leaf as an adulteration of tea?—The only other adulteration is an admixture of exhausted tea-leaves.

1173. Do you mean that they are sold again as tea?—I believe, though I cannot speak certainly of that matter, that it is the custom for certain people to call at large houses, such as hotels and coffee houses, where large quantities of tea are consumed, and purchase that which has been so used.

1174. Do you mean to say that the tea is sold as it comes out of the teapot after the water is taken from it; or is there any attempt to dry it again and sell it?—It is dried and prepared as the original tea leaf would be, and re-curled.

 1175. Did

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1175. Did you ever meet with any instance of this restored tea?—Yes, I have met with it.

1176. Have you poured boiling water upon it?—I have ascertained the amount of extract furnished by a certain weight of the tea; I have then ascertained how much theine has been in the extract, and from that we can calculate pretty well the amount of extract of tea present, because the average of theine is pretty constant.

1177. Might not this be united with inferior tea, and not tea which has been actually used once?—I think not, from the experiments I made; the quantity of theine was so much less than was obtained from any ordinary tea.

1178. Mr. *Gregson.*] Taking 16 ounces of mixed tea, what proportion of sloe-leaves or hawthorn-leaves have you found?—I have found 15 or 16 per cent.

1179. Mr. *Peacocke.*] Do you only suspect, or are you aware, that there is that kind of traffic going on from hotels in exhausted tea-leaves?—I only suspect it; I have no knowledge of the fact.

1180. *Chairman.*] Are there any other articles to which you wish to call the attention of the Committee?—Confectionery and lozenges. Most of the colours used, at one time, were highly injurious, being all mineral colours; but I believe, since attention has been called to the matter, vegetable colours are employed almost exclusively.

1181. Mr. *Gregson.*] Which are not injurious?—Which are not injurious. At the same time, lozenges have large quantities of chalk and sulphate of lime and starch in their composition.

1182. Mr. *Villiers.*] I suppose all these matters are to be found stated in your work?—Yes.

1183. Mr. *Gregson.*] You say generally that most articles of food are adulterated; that being so, would you add at the present time the words of a former author: "Beware! death in the pot!"?—Most decidedly.

Robert Dundas Thomson, Esq., M.D., F.R.S., L. & E., called in; and Examined.

R. D. Thomson, Esq., M.D., F.R.S. L. & E.

1184. *Chairman.*] YOU are the Professor of Chemistry at Saint Thomas's Hospital, I believe?—I am.

1185. And have had a great deal of experience with respect to various kinds of adulterations?—I have.

1186. Has your attention been chiefly directed to the adulterations of drugs?—Principally to the adulterations of drugs.

1187. Can you speak of the adulterations of other articles?—Of flour I can.

1188. Will you state to the Committee what your experience is upon that subject?—I have found a tendency to mix inferior with the better sorts of flour.

1189. Did you find any other admixture?—That was the principal nature of the adulteration.

1190. Have you ever found any alum in bread?—Yes, and I have also found bicarbonate of soda.

1191. Do you consider that an injurious adulteration?—I believe it is added for the purpose of neutralising the acid tendency in some kinds of moist flour. This was particularly the case in American flour when the first importations were made.

1192. Mr. *Villiers.*] Was it added in America, or here?—The bicarbonate of soda was manufactured in this country, sent to America, and added there.

1193. Then that mixture had reference to the voyage?—Yes, it was principally with reference to the voyage out and the land carriage.

1194. Mr. *Peacocke.*] That would not have a deleterious effect on health, would it?—No, I do not know that it would.

1195. Mr. *Sheridan.*] Could not they have obtained bicarbonate of soda in America?—Not at that time in the quantity which was required.

1196. Have you detected alum in flour?—No, not in flour.

1197. Have you found it in bread?—Yes; I know it is manufactured on a large scale for the purpose of being used in bread.

1198. Mr. *Villiers.*] How do you know it was intended for that purpose?—I was told so by the manufacturers.

1199. *Chairman.*]

1199. *Chairman.*] Do you believe it to be mixed in injurious quantities with bread?—I believe not generally.

1200. Would you consider a small quantity of alum mixed with bread, and taken daily, injurious to health?—I think so. I have sometimes found Indian corn mixed with flour; and I have been able to detect little more than half per cent. by means of the microscope. On one occasion I became acquainted with a case of very extensive adulteration of meal, under a contract with the Government for the supply of the Highlands of Scotland, where inferior kinds of meal were added to oatmeal, and the discovery of this was made by mere accident. The party was prosecuted, and I think was imprisoned for a year.

1201. What was mixed with the oatmeal?—An inferior kind of meal, which would not sell. With respect to arrowroot, I have found it to be largely adulterated with potato-starch.

1202. Do you consider that an injurious adulteration?—I consider it a gross fraud.

1203. Have you examined the article of mustard?—I have, and it is very seldom that you get mustard pure.

1204. What are the usual adulterations?—Turmeric is the colouring matter, and various sorts of pepper are employed to give it its peculiar taste. Here is a substance (*producing the same*) which is very much used for food for children; it is called mannacroup, and is imported from St. Petersburgh; that is Russian wheat. Here (*producing the same*) is some semolina, which I believe to be from the Mediterranean.

1205. Are those specimens pure?—Yes; I have here (*producing the same*) another from a wheat called soojee, from Bengal.

1206. Are these articles commonly sold?—Yes.

1207. Have you seen any specimens which have been obtained from the shops?—Yes; and I have found them very inferior kinds of wheat; and from the descriptions I have seen given of them they seem to be largely adulterated; I have also examined coffee to a considerable extent. I have found pure coffee to be a very rare substance when bought ground.

1208. What is the usual admixture?—Chicory.

1209. In what proportions have you found chicory present?—In all proportions, according to price; it is a substance much employed for dilution, just as a milkman uses water for diluting his milk.

1210. Do you find the prices of coffee range pretty much in proportion to the quantity of chicory which is contained in it?—In the poorer localities.

1211. Mr. *Gregson.*] Do you consider chicory injurious?—It has no nutritive qualities.

1212. Mr. *Peacocke.*] Have you found any difference in the articles you have analysed, as taken from the shops in the poorer and from those in the richer districts?—I think you get worse articles of this kind in the poorer than in the richer districts; and dealers are not very particular about mixing chicory only; they will put in anything, sometimes. I may mention as an example of an attempt at the adulteration of coffee, that a large cargo of lupines from Egypt was imported; the importers could not make any use of them, in consequence of their bitter taste. I was consulted upon the subject, and asked to give a certificate in favour of this substance, as being equal to coffee. I examined it, and found it contained a bitter principle, and that it was no more like coffee than roasted rye. But I ascertained, on examining it, that the bitter principle could be extracted by water, and I recommended the party who had applied to me to subject the lupines to the action of water, and told him it would then be serviceable for feeding cattle or pigs, and I understood he used it for that purpose.

1213. *Chairman.*] Are you aware that berries are made extensively, having the appearance of coffee-berries, which are not coffee?—I have even seen the apparatus employed for the purpose.

1214. Viscount *Goderich.*] Was that the apparatus of Mr. Duckworth, of Liverpool?—I do not know the name, but I have seen the apparatus; it was considered a very ingenious piece of apparatus.

1215. Will you describe the effect of it to the Committee?—It was something like a bullet-mould, for making chicory or any other substance into the form of a coffee-berry.

1216. Manifestly for the purpose of selling it as coffee?—As coffee.

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1217. Mr. *Gregson.*] Did you see any berries produced?—Yes.

1218. Were they a good imitation?—A very good imitation.

1219. Mr. *Swift.*] Were you consulted by the importer as to the cargo of lupines?—I was consulted by the lawyer who was employed by the party who purchased them.

1220. You said that they were used afterwards for the purposes for which they were fittest?—Yes, I have understood so.

1221. Mr. *Moffatt.*] Were they used as chicory?—They were ground to a very considerable extent, and I conceive that I stopped the further use of them.

1222. Do you believe they were extensively used for making chicory?—The attempt was made, but I believe was abandoned.

1223. *Chairman.*] What are those artificial berries made from?—It was said to be chicory.

1224. Mr. *Moffatt.*] Did you analyse them?—No.

1225. *Chairman.*] You are satisfied that it was not coffee?—It was pointed out to me as a very clever and a very proper thing.

1226. Do you suppose that that would be susceptible of being burnt and ground in the usual way?—It could be ground in the usual way.

1227. Then it would be very likely to deceive the public altogether. The public might purchase this assumed coffee berry, and find it to be chicory?—Yes.

1228. Mr. *Moffatt.*] Had the berry the appearance of raw or roasted coffee?—It resembled roasted coffee.

1229. Did you see the berry in any form corresponding to the raw state?—No.

1230. Are you aware that there are establishments for the manufacture of this so-called coffee?—I am not even aware of the manufacture of it; it was the machine that was shown to me.

1231. Was that in London, or in Lancashire?—I think it was in London.

1232. Mr. *Sheridan.*] Was there a patent for it?—I think so; at least it was registered, as I was told. I have some specimens here (*producing the same*) of green tea, one of them is manufactured from the Canton tea-plant; the other is a black tea; there is a chemical substance upon it. If you break the leaf, you will find that it is black tea coloured with Prussian blue.

1233. Is the facing of that tea injurious to health?—I think in considerable quantities it is so.

1234. Mr. *Gregson.*] Is this imported in any considerable quantities?—It was imported in very considerable quantities, I believe.

1235. Mr. *Moffatt.*] Do you know in what quantities in any one year?—No; this was given to me by a large importer.

1236. Mr. *Gregson.*] A large importer of this particular commodity?—No, a large importer of tea; this was received among his boxes.

1237. Mr. *Swift.*] Is that adulteration for the purpose of getting a higher price for green tea than could have been obtained had it been black?—Yes.

1238. *Chairman.*] That tea would be imported as green tea, would it?—Yes.

1239. Do you know whether the Custom House makes any distinction between green tea and black tea in the rate of duty?—I believe none.

1240. Then no inspection whatever takes place on the part of the Government?—I am not aware.

1241. Mr. *Moffatt.*] Can you give the Committee any proximate idea of the quantity of this tea which is imported?—I have no idea. I suppose the quantity is not great; it was rejected at once, and thrown back upon the agent.

1242. It was rejected as not being readily saleable in this country?—Yes. I have found a substance which was extensively sold for the purpose of making inferior teas appear of a superior kind, under the name of "la veno beno," at 6*d.* an ounce. I examined it, and found it to consist of 14 per cent. of sloe or hedge leaves, and 86 of catechu. I have also examined tea which contains nearly half its weight of iron-filings; the iron-filings of course fall to the bottom of the box with the finer portions of the leaves.

1243. Do you think that the adulteration occurred here or in China?—In China.

1244. Both la veno beno and the iron-filings?—No; I believe la veno beno was made in this country on a large scale.

1245. Mr.

1245. Mr. *Wise.*] Were those filings of iron which you found in these boxes, after the alteration with respect to the importation of tea into this country in 1844?—Since that.

1246. Were those filings wrapped up in tea-leaves?—No; they were distributed throughout the smaller portions of the tea.

1247. If a person applied a loadstone to the box of tea, he might possibly find a singular effect?—I showed to the persons who consulted me as to the means of detecting it, that a penknife rubbed on a magnet would attract the iron-filings if plunged into the tea-leaves.

1248. Mr. *Gregson.*] This was 10 years ago, you say?—Within the last 10 years.

1249. *Chairman.*] Have you made other experiments within 10 years?—Yes.

1250. How much tea was imported which had iron-filings in it?—I do not know.

1251. Mr. *Swift.*] Had you analysed tea prior to that period?—Yes. I have been in China myself.

1252. Have you reason to believe that the tea imported now is more adulterated than it was before the alteration of the law?—I think not. I have heard that the Chinese were in the habit of putting in iron-filings 20 years ago.

1253. Mr. *Moffatt.*] Do you mean to say it was a constant practice to put iron-filings into tea in China, before exporting it to England?—I do not say it was a constant practice; I understand it has been done.

1254. In how many cases?—I have been told of it; I do not suppose it was a common thing.

1255. Mr. *Gregson.*] You do not speak from any examination of your own?—Except in the case of this single box, I do not.

1256. Mr. *Moffatt.*] How was it you happened to see this single sample of tea with iron-filings in it?—It was brought to me by the Lord Provost of Glasgow.

1257. It was not in China you gathered the knowledge of iron-filings being mixed with tea, was it?—I was told in China that the Chinese were sometimes in the habit of adding iron-filings.

1258. Did you get that information from any of the large mercantile houses in China?—I think so; it was a common statement there that it was occasionally done; but I apprehend it was not habitual.

1259. If occasionally done, was not it done as a fraud committed upon the buyer of tea; was it ever done within your knowledge with his cognizance?—I think not.

1260. Mr. *Peacocke.*] Were the merchants out there aware of it?—Not till the tea was brought home.

1261. They became aware of it after they had purchased it?—Yes; that might be a rare case.

1262. Mr. *Kinnaird.*] Was this box, which you alluded to, one taken out of many, or was it a single box to which your attention was particularly directed?—The sample was sent to me for examination.

1263. Was it one box taken out of a number of boxes?—I think it was a single box.

1264. Mr. *Swift.*] Prior to the alteration of the law, you say iron-filings had been reported to have been found in teas imported under the East India Company's charter?—I say that I have heard in China that the Chinese were sometimes in the habit of adding iron-filings to their tea.

1265. Are not you aware that prior to the alteration of the law, a course of inspection was adopted by the East India Company?—I am.

1266. Do you think that that was evaded in any way by the inspectors appointed by them?—I think if the quantity of iron-filings was small, it might be overlooked.

1267. Mr. *Wise.*] If the inspectors in England discovered it, they would report it to what were called in those days the security merchants?—Yes, no doubt of it.

1268. Mr. *Moffatt.*] Did you ever know of any such tea being imported, except that box?—I am not aware of any instances, from my own knowledge; I have known bricks inserted in the chests.

1269. *Chairman.*] Have you known any other articles of food adulterated?—I have known sugar adulterated; there is a frequent complaint that the finely

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crystallised sugar is by no means sweet. I have had samples of this sent to me from the country, and upon examining it I have found it to contain lime combined with the sugar.

1270. Mr. *Moffatt.*] Do you speak of sugar which has been refined in this country?—Yes; 10 per cent. of lime will render the sugar perfectly bitter.

1271. Mr. *Gregson.*] You do not apply that remark to the raw sugar, as it is imported?—No.

1272. *Chairman.*] In what proportion have you found this adulteration to exist?—About a half per cent., or one per cent.

1273. Was that an adulteration with the object of cheating the consumer?—I think it is owing to an imperfection in the process; it is a chemical compound which the lime forms with the sugar.

1274. You do not speak of that as an intentional fraud?—No; I think it is carelessness in the manufacture.

1275. Mr. *Moffatt.*] Have you found lime exist in the hard lump sugar, or merely when it has been crushed?—Only chemically combined in crushed sugar.

1276. In that sugar which has only undergone a partial process of refinement in this country?—Yes; with respect to prepared forms of sugar, such as sweetmeats and comfits, they are adulterated to a very large extent. On being consulted by some parties upon the adulteration, I procured from a great manufactory of those substances specimens at different prices. There were about ten different samples, of which I have the details here; I will first speak of what are called mints, at 7*d.* a pound; they contained 3·03 per cent. of a substance which is sold under the name of terra alba. This terra alba I found to be plaster of Paris. The second sample, at 84*s.* per cwt., contained 20·84 per cent. of terra alba. The third was carroways, at 5*d.* a pound, and contained 27·82 of terra alba. The fourth, another specimen of carroways, at 8*d.* a pound, contained 19 22 per cent. of terra alba. The sixth, almonds, at 10*d.* a pound, contained ·96 per cent. of terra alba. The seventh, another sample, at 8*d.* a pound, contained 7·02 per cent. of terra alba. The eighth sample, at 8*d.*, contained 22·76 of terra alba. Raspberries, at 9*d.* a pound, contained 7·76 of terra alba. Strawberries, at 9*d.* a pound, contained 8·28 per cent. of terra alba.

1277. *Chairman.*] Is not the mixture of this terra alba very injurious?—I think it is very objectionable, in addition to its being a gross fraud.

1278. Mr. *Gregson.*] What is the effect of the plaster of Paris upon the stomach?—It is that of a quantity of rubbish thrown on to the stomach. I have here a substance which was sent to me by a British brandy-maker; it is a substance used to flavour these comfits; I find it consists principally of the oil of grain, which I believe to be injurious. It is obtained from the distillation of raw grain particularly.

1279. Viscount *Ebrington.*] Do people consume a portion of that in consuming spirits distilled from grain?—No, it is separated from the spirit.

1280. *Chairman.*] For what is that used?—I was told it was used for manufacturing some kind of British brandy; it gives a colour and a particular flavour; in fact it converts whiskey into British brandy.

1281. Mr. *Moffatt.*] Do you know that it is used for the purpose of that manufacture?—No, I was only told so.

1282. Was it told you by a manufacturer of British brandy, that it was used for that purpose?—The specimen was sent to me by a distiller, to ascertain its nature.

1283. Viscount *Goderich.*] And he told you it was used for that purpose?—Yes.

1284. Mr. *Kinnaird.*] What are its elements?—It is amylic alcohol, with a salt of amyle and some spirit.

1285. Would it be fatal to any person who took it?—I consider it would be injurious.

1286. Mr. *Moffatt.*] Was it a distiller or a rectifier who sent it to you?—A distiller.

1287. Mr. *Swift.*] Is the quantity in that bottle sufficient to destroy life?—I should not like to take it.

1288. Mr. *Peacocke.*] Is that used extensively in the preparation of sweetmeats?—Yes; I have understood that the salts of amyle are employed for this purpose.

1289. Is it used in the higher class of shops?—Yes; what are called pine-apple drops are said to owe their flavour to a salt of amyle.

1290. Are

1290. Are preserved fruits put into this spirit?—Not that I am aware of.

1291. Mr. *Kinnaird.*] Is this what you call oil of grain?—It contains oil of grain.

1292. Viscount *Goderich.*] Is it used in the preparation of brandy-balls?—Probably it is.

1293. Mr. *Peacocke.*] Have you any evidence with respect to adulteration in the preparation of sausages?—I only speak, of course, from what I have heard; but I have heard that sausages are made from horses' tongues; I believe that the tongues of horses which are killed at the knackers' are used; I do not speak from personal evidence.

1294. Mr. *Moffatt.*] Is any other part of the horse used as food besides the tongue?—I am rather afraid so.

1295. Mr. *Peacocke.*] I suppose horse-flesh would not be more prejudicial to health than other flesh, would it?—Not if the horse were healthy; it is only if the horse has died from disease, or been killed in consequence of being ill.

1296. *Chairman.*] It is not usual to kill horses in a healthy state, I presume?—It is not, as that would afford an expensive species of food.

1297. Mr. *Wise.*] The comfort and health of the great masses of the people depend so much upon good bread, that I desire to ask you if there is any easy mode of ascertaining the quality of bread which can be employed by members of the humbler classes of society?—I am afraid there is no easy way of detecting the presence of alum in bread; but every one can judge whether bread is well baked or not; you may judge from its dampness that probably potatoes are present.

1298. The best bread, if put into water, would absorb a considerable amount?—Yes.

1299. If two persons desired to compare their bread, they might do it in this manner: each of them might cut a slice of bread, and put it into water; the good bread would absorb much more water than the bad bread?—Yes; perhaps some idea might be formed of their relative power of absorbing water by this method.

1300. *Chairman.*] Have you made any observations upon the state of the water which is supplied for consumption?—Yes. The first point, with respect to the water of London, is its inferiority to that of many other towns in the country. I have a diagram here (*producing the same*) which will make that obvious to the eye. It represents every grain of foreign matter in a gallon (of various waters used in Great Britain) as a degree of impurity. I consider distilled water as zero; as the curve begins to ascend, you arrive at London water. Another diagram (*producing the same*) represents the different degrees of impurity of the water supplied by the different companies in London. Another (*producing the same*) represents the various degrees of hardness. Another, the state of the Thames at high and low water; and another, the organic matter.

1301. Will you be good enough to state to the Committee such observations as you think may be drawn from an examination of those diagrams?—The Committee will find, from the diagram representing the London water, that the quantity of foreign matter at Thames Ditton is less than it is as you descend the river; it seems to increase gradually as you descend. When you come to Vauxhall, we find that the water varies very much. I found it contain, in March 1855, 23·8 grains of impurity in a gallon. In September, last year, I found it to contain 72·66 grains, as supplied to a house in Bermondsey. In July, this year, I found it to contain as much as 84·94 grains in the gallon.

1302. Mr. *Gregson.*] Have you found that to have any reference to the dry weather?—On March the 15th, 1855, I found it to contain 23·8 grains of impurity per gallon; on the 7th of May of this year it contained 32·2 grains; on the 7th of June it contained 41·88 grains, and on the 7th of July, 84·94 grains; that was the water supplied to St. Thomas's Hospital, or rather in front of the hospital at the cab-stand. The reason of that increased impurity, I think, is explained by this diagram (*producing the same*); here is represented the condition of the river at high-water, and its condition at low-water; the total amount of impurity taken at Vauxhall at high-water is 102·42 grains.—(*Vide* Diagrams at the end.)

1303. Mr. *Kinnaird.*] How far does the influence of the salt water extend?—I have not examined that; it would vary a good deal at different times.

Veneris, 27° *die Julii*, 1855.

MEMBERS PRESENT.

Mr. Scholefield.	Viscount Ebrington.
Mr. Sheridan.	Mr. Knight.
Mr. Moffatt.	Mr. Wise.
Mr. Otway.	Mr. Gregson.
Mr. Villiers.	Mr. Kinnaird.

WILLIAM SCHOLEFIELD, Esq., IN THE CHAIR.

Robert Dundas Thomson, Esq., M.D., F.R.S., L. & E., called in; and further Examined.

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1304. Viscount *Ebrington.*] YOU spoke on the last occasion of certain results which you had obtained from some specimens of Thames water taken at different times. Have you analysed any specimens of Thames water?—I have.

1305. What proportion of the solid matter which you found in the specimens you analysed taken from the river do you attribute to the drainage or sewage of London, and what proportion to the hardness of the water, or to the drainage of the large and populous and highly cultivated valley lying above the metropolis?—The total quantity of impurity at high water at Vauxhall, comprehending mechanical matter, organic matter in solution, and inorganic matter in solution, was 102·42 grains per gallon. At Hungerford the total quantity of the same ingredients was 115·68 grains per gallon; and at the Surrey end of London Bridge the same ingredients amounted to 113·24 grains.

1306. During the same states of the tide?—Within the same hour, as nearly as possible, and on the same day.

1307. So that there was slightly less impurity at London Bridge on the Surrey side than there was at Hungerford?—There was.

1308. Was the tide flowing or ebbing at the time?—I should think it was scarcely high water.

1309. That would account for the slightly superior purity of the water at London Bridge, would it not, because the sea water would be coming up from below London, and driving the impurities of London up towards Hungerford?—To a certain extent that would account for it, and likewise at Hungerford there is a great deal more of mechanical movement in the river.

1310. *Chairman.*] From what does that arise?—From the steamboats at Hungerford Pier.

1311. Viscount *Ebrington.*] Did you analyse those different specimens of Thames water?—I did. The amount of mechanical impurity at Vauxhall was 60·50; organic matter, 5·28; inorganic impurity, 36·64. At Hungerford the mechanical impurity was 64·64. The organic impurity was 5·8; and the inorganic impurity, 45·24, making altogether 115·68 grains per gallon. At London Bridge the mechanical impurity was 63·44; organic impurity, 4·72; inorganic matter, 45·08, making altogether 113·24 grains per gallon.

1312. At this state of the tide, a great proportion of the impurity of London would have been carried up by the tide beyond Vauxhall Bridge?—I think so.

1313. So that those particular specimens do not give the Committee any idea of what the water of the Thames is above the metropolis?—No.

1314. Have you any analysis of the water of the Thames taken at a different state of the tide?—I can give it at low water taken at the same parts; the total impurity at Vauxhall, at low water, was 27·14 grains per gallon; at Hungerford, at low water it was 48·84 grains per gallon; at London Bridge, the Surrey end,

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32·08, and at Greenwich on the same day, 95·68. The mechanical impurity at Vauxhall at low water was 10·26 grains; the organic impurity at Vauxhall was 4·34, and the inorganic impurity was 12·54, making in the gallon 27·14. At Hungerford, the mechanical impurity was 16·80 grains; organic 8·40, and inorganic 23·64, making altogether 48·84 grains per gallon. At the Surrey end of London Bridge the mechanical impurity was 3·52; organic impurity, 7·36; inorganic 21·20 grains, making in all 32·08 grains per gallon; at Greenwich, on the same day, the mechanical impurity was 3·7 grains; the organic impurity 19·44; the inorganic impurity 72·54, making in all 95·68.

1315. Will you be kind enough to state in what sense you use the words, mechanical, organic, and inorganic?—A mechanical impurity is that which is diffused through the water, and can be removed by filtration; an organic impurity is that which remains in solution, and is not removable by filtration, and inorganic impurity is a matter which is not destructible by heat, and is also in solution.

1316. How do you account for the greater proportion of impurity at low water which is found at Hungerford, as compared with London Bridge?—The difference is chiefly in the mechanical impurity.

1317. Do you suppose that it arises from the greater disturbance of the water at Hungerford?—Yes, and also there is a very disgusting sewer which passes into the river at the very place where this specimen was taken.

1318. At what time of the year were these specimens taken which you have been referring to?—The high water specimens were taken on the 8th of December 1854, and the low water specimens on the 2d of September 1854.

1319. What sort of weather had prevailed about the time?—It was dry weather.

1320. Had it been dry for some time?—It had.

1321. What proportion of this impurity is attributable to the refuse of man and of beast, and what proportion do you put down as due either to calcareous matter taken up in solution by the water higher up the stream than the metropolis, or to the washings of the roads, and the pavements, and the roofs of the houses?—I can give you an analysis of that mechanical matter, but made some years previously, in 1850.

1322. Would it practically hold good at the present time?—I believe it gives you a pretty good idea of the present time; those specimens are regularly taken up alongside the "Dreadnought" every morning; a number of them were given me for examination.

1323. You speak of the "Dreadnought" which is moored off Greenwich?—Yes; so that it may be supposed to correspond with the mechanical matter which I have given here as being obtained at Greenwich. In December 1850, the composition of 100 parts of this substance, after being dried in the air, was, water 9·04, organic matter 21·28, silica and clay 69·68.

1324. You detected no calcareous matter in that water?—There was a little, but very little. It appeared to me to be principally earthy matter, together with siliceous shields of certain kinds of the lower classes of plants and animals.

1325. Had the weather, when those specimens were given to you, been generally dry or wet?—I have no note of the nature of the weather; but as these specimens were taken up and sent to me by Mr. Glaisher, of the Greenwich Observatory, it is very easy to ascertain the nature of the weather.

1326. The difference in wet and dry weather, in the proportion of calcareous matter, would be very considerable, would not it?—Very considerable.

1327. In dry weather the water would be harder than in wet weather, in all probability, would not it?—I have sometimes found it to be so; at other times it is otherwise; but it depends, I believe, on the sources from which I have taken the water. If the water has been allowed to stand for a considerable time, it becomes softer, and deposits the lime, and therefore you cannot judge so well whether it is natural to the water or not.

1328. The general analysis of the Thames water, as supplied to the inhabitants of London from places above the metropolis, and therefore far above Green-

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wich, shows it to be harder than the analysis which you have now given, does not it?—I can only speak as to my own analyses, in which the specimens were generally taken from cisterns where I have been examining the water supplied by the companies.

1329. Do they give harder or softer water than this which you have now described as taken from Greenwich?—I cannot speak with respect to the hardness of the Greenwich water.

1330. Did you analyse the organic and inorganic matter which you found in solution at Greenwich?—I did not separate the carbon, and so on, but I found it was vegetable matter and animal matter.

1331. I understand you to say that this analysis of water at Greenwich was made solely with a view to ascertain the component parts of the deposit or mechanical impurity, and gave no idea of the hardness or softness of the water at that place?—No; softness and hardness being due to the relative amount of matter in solution.

1332. Mr. *Otway*.] What is the distinction which you draw between mechanical impurity, and organic and inorganic impurity?—Mechanical impurity is matter which you can see with the eye; chemical impurity is what is invisible and in solution, as sugar is in water.

1333. Mechanical impurity is removable by filtration, but the organic and inorganic impurities are not removable by filtration?—That is so.

1334. Viscount *Ebrington*.] You might put into a filter certain matters which have a chemical affinity for the impurities of the water, and would so chemically remove them; but that would be due to the chemical action, and not to its mere action as a filter?—Yes.

1335. The state of impurity of the Thames round the metropolis varies very much, does not it, with the different states of the weather?—Very much.

1336. To what do you attribute that particular difference in the water of the metropolis; I am not speaking of the difference which is invariably found in every river in flood time and in a time of drought, but specifically of the metropolis, to what do you attribute any difference in the water here?—To the intermixture of sewage matter, and likewise sea water.

1337. It is obvious that the quantity of vegetable and animal refuse which is produced in the metropolis would be pretty nearly the same day by day from the same population; therefore in flood time or in dry weather the quantity of that which is removable by the sewers would not materially differ, supposing the action of the sewers to be perfect, would it?—So much depends upon the tide that it would be difficult to say how much passes away at once, and how much retrogrades at each particular time of the day.

1338. Supposing the action of the sewers to be perfect, the impurities of London within each 24 hours would be removed down the river so far as the river was the receptacle for them?—One would expect so.

1339. Is it not notorious that the sewers are very far from acting with that perfection, either the main sewers or the house drains; and is not it probable that a great part of the difference observable between flood time and dry weather in the Thames arises from the imperfect discharge of the house-drains and of the sewers, and there being accumulations which can only be removed by the action of a large body of water in rainy weather?—No doubt a great deal is removed by rain during floods.

1340. So that in dry weather the Thames contains a less quantity of vegetable and animal refuse than would be due to it, so to speak, at that time, supposing it to be continued as a receptacle for such refuse, and in rainy weather there would be the accumulation of the dry weather hurried into it?—Yes.

1341. The population of London is about two and a half millions, is not it; what do you consider to be the average amount of the dry solid animal refuse which would be due daily to such a population?—I have not the calculations here, and should not like to venture on a guess on the subject.

1342. The total amount of actual solid matter of that kind produced by such a population is much smaller than is generally supposed, owing to the immense proportion of it consisting of water?—It contains a very large quantity of water.

1343. So

1343. So that the daily amount of refuse produced, if carried into the Thames, would not produce anything like the effects observed by Professor Faraday, and by yourself and others, in particular states of the weather?—While the drains are in an imperfect state, and in many districts there is no drainage; there are sewers, but there is no communication between the houses and the sewers; and, secondly, in a very great number of instances I have found, that although there was said to be a drain, yet the old cesspool remained; so that the only portion of matter which escaped from the house was the overflow of the cesspool, and of course the quantity of this would increase by the amount of rain.

1344. The rapid flow of the water enables it to carry along with it, in suspension, a great deal which in a slow and feeble stream would be deposited along its course?—Yes.

1345. So that a great deal of the foulness of the Thames at particular times may be attributed to the arrears of animal and vegetable refuse which are at such times only hurried into it on account of the imperfect action of the drainage of London at other times?—The rain acts, in fact, so as to flush the drains.

1346. Unless the detailed drainage of London were improved we should always be liable, with any system of intercepting sewers, to great volumes of water coming down charged with impurity of that sort?—As long as the present condition of circumstances remains, you must be always liable to that in wet weather.

1347. The water draining into the Thames would be most impure just at the time when the volume of it was so great as to render it practically impossible to construct anything of reasonable dimensions which could carry it off?—I believe, to a great extent, it would be so.

1348. In London, and large towns, I believe the whole of the rain-fall is very rapidly carried away by the drainage, owing to the hardness and impermeability of the surface on which it falls, instead of being slowly filtered through beds of earth, or running down porous ditches and winding streams, as is the case in the country?—Yes, it passes with great rapidity, as has been often proved experimentally; substances thrown into a sewer are detected at the mouth of the sewer very soon.

1349. So that our great remedy for the foulness of the Thames would be the regular discharge from each house and street of the impurity produced in it, rather than any attempt at intercepting all that before proper measures had been taken to ensure its regular discharge either into an intercepting sewer, or into the Thames, had been deposited along the drains?—Yes; I should like myself to see the two plans taken up simultaneously.

1350. No intercepting scheme without an improvement in the daily discharge of the daily-produced impurity of the town could effectually purify the river, as I understand you?—I think not.

1351. With regard to the impurity of the water supplied to London, what number of grains of calcareous matter have you found per gallon in the different waters supplied for the domestic consumption of the inhabitants of London?—In the Lambeth Company's water, which is taken from Thames Ditton, the quantity of carbonate of lime I found to be 10·144; this water, however, was taken from a cistern.

1352. Would its being in a cistern tend to diminish or increase the hardness?—It would soften it a little. The Grand Junction Company, 8·870; the West Middlesex, 9·919; the Chelsea Company, 9·55; the Southwark and Vauxhall, 10·7; the New River Company, 11·985; the East London Company, 11·997; the Kent Company, 9·54. All of these samples, I think, were taken from cisterns. The Table which I have here exhibits the amount of the other constituents.

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COMPOSITION OF METROPOLITAN WATERS.

	GRAINS PER IMPERIAL GALLON.							
	THAMES WATERS.					OTHER WATERS.		
	1. Lambeth Company.	2. Grand Junction Company.	3. West Middlesex Company.	4. Chelsea Company.	5. Southwark Company.	1. New River Company.	2. East London Company.	3. Kent Company.
Organic matter	1·390	1·920	2·080	5·410	3·560	2·330	1·940	1·480
Silica	·350	·090	·520	1·511	·240	·180	·320	·420
Sesquioxides of iron, alumina, and phosphates	·215	·730	·460	·639	·460	·400	·520	·130
Insoluble lime	5·680	4·967	5·555	5·348	5·992	6·712	6·718	5·342
Soluble lime	·944	·975	·868	2·649	2·374	·918	·549	1·254
Insoluble magnesia	·281	·343	·342	·209	·238	·407	·354	·100
Soluble magnesia	·260	·228	·157	1·283	·886	trace	·100	·400
Sodium	·379	·372	·643	11·708	5·967	·942	9·951	·343
Potassium	·328	·249	·259	1·304	1·086	·320	·307	·518
Ammonia	·023	- -	- -	- -	·297	—	—	—
Sulphuric acid	1·599	1·647	1·504	6·043	2·980	1·393	·841	2·344
Chlorine	1·020	0·980	1·160	19·554	12·160	1·430	·860	1·240
Nitric acid	- -	- -	- -	- -	·050	—	—	—
Carbonic acid	9·550	8·560	9·880	9·106	9·941	11·442	11·336	8·616
Organic matter	1·390	1·920	2·080	5·410	3·560	2·330	1·940	1·480
Silica	·350	·090	·520	1·511	·240	·180	·320	·420
Sesquioxide of iron, alumina, and phosphates	·215	·730	·460	·639	·460	·400	·520	·130
Carbonate of lime	10·144	8·870	9·919	9·550	10·700	11·985	11·997	9·540
Sulphate of lime	2·149	2·368	2·109	6·432	3·179	1·812	·897	3·085
Nitrate of lime	trace	trace	trace	trace	·076	trace	trace	trace.
Chloride of calcium	- -	- -	- -	- -	2·108	—	—	—
Carbonate of magnesia	·592	·720	·720	·438	·500	·855	·743	·210
Sulphate of magnesia	- -	- -	- -	1·390	—	—	—	—
Chloride of magnesium	·617	·542	·360	1·947	2·101	trace	·237	·949
Sulphate of potash	·730	·553	·577	2·903	2·413	·712	·682	1·153
Chloride of potassium	- -	- -	- -	- -	trace.	—	—	—
Sulphate of soda	- -	- -	- -	trace	trace.	—	—	—
Carbonate of soda	- -	- -	- -	- -	trace.	—	—	—
Chloride of sodium	·966	·947	1·637	29·797	16·001	2·355	1·125	·874
TOTAL	17·153	16·740	18·443	60·017	40·593	20·629	18·461	17·841
Residue by evaporation	17·440	16·920	18·970	60·170	41·780	20·780	18·300	17·760
Carbonate of ammonia	·064	- -	- -	- -	·840	—	—	—
Hardness	13·2	12·6	12·8	18·4	18·2	14·	14·2	12·2

1353. In what is called flood time there is always observable in water taken from rivers, a certain per centage of other earthy and vegetable matters, is there not?—Yes.

1354. May this be taken as the ordinary state of the water as supplied to the inhabitants?—Yes, at this particular season of the year; these analyses were made in November 1854.

1355. Soap consists in general of five or six per cent. of alkali, 50 or 60 per cent. of water, and 30 to 40 of fatty acids; is not it the case that five or six grains of lime will destroy 100 grains of soap by turning them into curds?—Somewhere about that; it would vary considerably.

1356. So that the presence of this amount of calcareous matter must cause a very great waste and expenditure of soap, must it not?—No doubt of it.

1357. In the preparation of coffee and tea, is not it the case that lime in water precipitates, and destroys the caffeine and theine?—It interferes with the solvent powers of the water; and in dyeing, it interferes very much with the brightness of the colours.

1358. So that the hardness of water, quite apart from mechanical or organic impurity, is a great source of waste, is not it, in soap on the one hand, and tea and coffee, and drugs and dyes, on the other?—It is.

1359. Therefore it is quite a mistake to suppose it is a matter of light moment to a population, especially to a large and civilised population, whether their water

water is hard or soft?—I consider it to be a very important point that it should be soft.

1360. The Committee have to consider, with regard to the question of the purity of water, not only the effect produced on health by the presence of animal or vegetable matter in a decomposing state in water, but also the presence of calcareous matter, which causes immense loss and waste to the inhabitants using the water?—Yes.

1361. Is it not inevitably the case that the supply of water from rivers must be subject to greater contamination than water from springs higher up on the hills?—Certainly, very much so.

1362. Therefore the river supply, if you can get any other, must be considered as inferior?—Yes; particularly where the population on the banks is considerable.

1363. That would apply especially to the Thames, would not it, where, above the metropolis, there is something like a million of population located on the banks of the river, or on the banks of streams draining into it?—Certainly.

1364. So that the Thames at Teddington Lock, or Thames Ditton, though it may give a better supply as regards quality than you would get near Vauxhall Bridge, or near Hungerford Bridge, yet still gives a supply not only harder from the calcareous nature of the country through which a great part of the Thames passes, but also one which is deteriorated by the drainage into it of the refuse of a very large population, and of many large towns?—Yes.

1365. Mr. *Otway*.] With regard to the "Dreadnought," that is a hospital ship for seamen, is not it?—Yes.

1366. Do you know how many patients there are on board?—I am not aware.

1367. How is the water supplied to them?—I am not aware of the circumstances; all I know of the matter is, that the deposit I have mentioned was sent to me by letter from the "Dreadnought."

1368. The deposit from water taken up alongside the "Dreadnought"?—Yes; every day observers take the temperature of the water, and in doing so they take up a quantity of water in a bucket; and they also used to determine the amount of deposit from a certain quantity of water, and they used to publish the results in the Registrar-general's Report.

1369. Was this done by the medical men on board the "Dreadnought"?—Yes; at the request of the Astronomer Royal.

1370. Mr. *Villiers*.] Did I correctly infer from what you stated that it would be impossible to procure a supply of pure water for such a large community as that of the metropolis?—I think not.

1371. At present, do you consider that all the water which is supplied is more or less impure?—I think so; especially water taken from the Thames.

1372. Have you any suggestion to make as to the source from which the public could be supplied with pure water?—I have thought of the subject. At the same time, I think that the subject requires further inquiry, because a great deal depends upon the opinion of engineers. So far as the chemistry of it goes, I think it is quite satisfactory, and we could obtain much purer water than we have at present.

1373. Without injuring the neighbourhood from which it was taken so essentionally that it would be objectionable?—Yes.

1374. I take for granted that you distinguish what may be called impurities of water from those impurities you have spoken to in other articles, inasmuch as the companies themselves would just as soon supply pure water as impure water, if they could get it?—Certainly.

1375. Therefore it is not for any pecuniary profit, or any fraudulent purpose, that they supply water of this injurious character?—Certainly not.

1376. At present, therefore, the town is in an helpless state; the companies cannot improve the water with their present powers?—I think not, except that they might soften the water; I believe all the companies might soften their water.

1377. That is within their power?—Yes.

1378. Do you know anything of their contract with the people whom they supply; do they give a description of the water they will supply?—I am not aware.

1379. Do they even undertake to supply pure water?—No, I believe not.

1380. Do not the Chelsea Company undertake to supply water which has been filtered?—I have understood they filter their water, and judging from my experiments upon it, I should say they do filter it.

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1381. Do you know of any scheme which has been suggested for the improvement of the water supplied to the metropolis?—I am aware of a method by which it might be softened.

1382. Do you think the companies might do that?—Yes.

1383. At considerable expense?—Yes, at considerable expense; but from data which have been given to me it appears that some of the expense would be met by the sale of the produce of the softening process; there is a quantity of chalk which is formed of a very fine description which could be sold as whiting.

1384. Would the water so rendered soft be pure for use?—It would be quite pure, so far as the addition of the lime which is necessary for the process was concerned; it would add nothing to the water, if the process were properly performed, and it would take away certain impurities in the water.

1385. At present unless you could convince the companies that they could do this even with a profit to themselves, there is very little chance of its being done, I presume?—I am afraid there is very little chance; but the table which I have here show how the water from the chalk strata might be softened.

	Watford.		Plumstead.	
	HARD.	SOFT.	HARD.	SOFT.
Organic matter	1·400	1·420	2·720	2·800
Silica	·480	·680	·720	·720
Alumina and phosphates	·240	·120	·340	·280
Carbonate of lime	14·131	·520	11·406	·400
Carbonate of magnesia	·870	·390	1·450	·400
Sulphate of lime	1·887	·500	8·864	8·976
Nitrate of lime	1·521	1·580	—	—
Sulphate of potash	·569	·569	·284	·284
Sulphate of soda	- -	- -	1·235	1·445
Chloride of sodium	1·153	1·548	3·558	3·054
Total	22·251	7·327	30·577	18·359
Residue by evaporation	22·400	8·030	30·900	18·28

1386. Should you state that the water has become more impure of late than it was before?—Not having made a number of experiments on the subject, I am not able to speak to the water at present, but last year the water of certain companies was much more impure according to my experiments, than it had been four or five years before, according to other experiments.

1387. Did you make an investigation into the water of all the companies?—Yes.

1388. And some was much more impure than others?—Yes.

1389. There is no necessity for that, is there?—It depends upon the source from which the water is derived.

1390. Viscount *Ebrington*.] And the means taken to purify it?—Yes.

1391. Mr. *Villiers*.] Have you found in the water of some of the companies that there is comparatively little impurity?—Yes, considerably less.

1392. All the others might if they chose render their water as pure as the one you are referring to now?—I believe that all the companies deriving their supply from the Thames will have water of the same degree of impurity; they are all to derive it from nearly the same point, and of course it will be nearly of the same quality.

1393. I take for granted there is some process the water goes through before it is supplied, is not there?—It ought to be filtered.

1394. It would not be tolerable unless it were filtered, would it?—I think it is not fit for domestic use.

1395. Have you any knowledge on that subject, whether any water is supplied for use which is not filtered?—I have examined specimens of water which did not appear to me to have been filtered.

1396. Do you know if there is a difference in the price paid for the supply, where it is undertaken to be filtered?—I am not aware.

1397. Mr.

1397. Mr. *Otway.*] Do you consider the water supplied by any of the London companies, after it has undergone filtration in a house by a private filter, to be fit for domestic purposes?—I consider it very much inferior to the water supplied to many large towns of Great Britain.

1398. Even after filtration?—Even after filtration; it is much harder, and it contains certain substances which appear to me to indicate the existence of sewage in the water.

1399. Impurities still remain in the water after filtration?—They do.

1400. Mr. *Villiers.*] There are springs in London, are there not, from which you get perfectly pure water?—Yes, from the chalk; pure in a certain sense; free from mechanical impurity.

1401. Is there a great supply from that source now in London?—That is the source to which I referred, as involving a point which engineers were required to settle. I am quite convinced that the water is an excellent water; I refer to the water from the chalk beds; but of course I cannot speak as to the abundance of the supply; I can only speak as to the chemical character of the water, which I consider to be good.

1402. Do you know to what extent different parts of the town are supplied from those springs?—I know there are a great many shallow wells supplying the town, and those I consider to be injurious to health.

1403. They appear to be perfectly pure?—They have no chemical impurity, but they contain large quantities of ammonia and nitric acid, which appear to me to be derived from surface percolation, and therefore from urine.

1404. Viscount *Ebrington.*] Percolation from grave-yards and cesspools, and things of that kind?—Yes; and from the surface.

1405. Mr. *Villiers.*] Would not that be detected in the taste or the appearance of the water?—No; the matter is in solution, just as I said before, sugar is in solution in water.

1406. Have you ever considered what are the peculiar effects produced by this impure water upon the constitution?—I may give an example: in a particular house on the south side of the river I found water, derived from a well which supplied a house, exceedingly impure, and with a most nauseous smell. The quantity of nitric acid in it was great, and also of ammonia. This water was sent to me for examination in consequence of the children in the family having been continually complaining of fever.

1407. Did that lead you to consider whether it was the water which produced that effect?—I thought it was possible that the water might have contributed to the effect, and I advised that the well should be shut up, which was done.

1408. With what result?—I am not aware that there has been any complaint in the family since.

1409. Have you made any complete experiments of that kind so as to ascertain what the effect upon the human body of this kind of water is?—It is very difficult to eliminate the effects of water from effects produced by many other causes.

1410. Supposing you had followed out the experiment in the case you referred to, and found the children had ceased to be feverish, and the inmates of that house were no longer ill, you would have concluded, I presume, that the water had been the cause of their illness?—I think that highly probable; I believe the state of the water consumed contributes to the propagation of disease.

1411. Have you connected it at all with epidemics so as to say whether it predisposes people to suffer from them?—I think so, with regard to the cholera.

1412. Is it true that, where the water has been good, the cholera, generally speaking, has been less fatal than in other places?—That has been the result of my observation.

1413. And the contrary, I suppose, is the case, that where the water has been bad, it has been peculiarly fatal?—Yes.

1414. Viscount *Ebrington.*] Is not it true that the inhabitants of districts which were supplied with water pumped up from the river within the metropolis, did suffer more from the cholera than those which were supplied with water taken from other parts of the river?—I think the evidence in favour of that view very strong.

1415. Mr. *Moffatt.*] You stated that the Chelsea water was filtered. It appears from the diagram you have been kind enough to hand in to the Committee, the Chelsea water is the most impure of all the metropolitan sources of supply;

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supply: how do you reconcile the fact, which appears on the diagram, of there being 60 grains per gallon in the Chelsea water against only 10 grains in the water of the Lambeth Company?—Because the Chelsea water contains a very large amount of sea water.

1416. A larger amount than the source of the Lambeth supply?—Yes; the Lambeth supply is from Thames Ditton, that of the Chelsea Company from Vauxhall.

1417. You also stated you were not aware of any method by which we could improve the present supply in London, except by the application of lime under a superior system of filtration, did you not?—I think those would contribute very much to purify the water.

1418. At what period was this diagram made?—About September 1854.

1419. Are you aware whether the Vauxhall and Southwark Company, whose water appears here to have a large amount of impurity, have improved their source of supply since then?—I have to-day ascertained, by experiment, that they have done so.

1420. What is the result of your experiment to-day?—Water taken yesterday from a pipe in the street near St. Thomas's contained 15¼ grains; very nearly the same as the Lambeth water.

1421. It contained 15 grains of impurity per gallon, whereas the analysis made last September exhibited 40 grains per gallon?—Yes.

1422. With regard to the evidence you have given as to the water taken near the Dreadnought, I believe no part of London is supplied from that part of the Thames, is it?—I think not.

1423. What inference do you draw from the purity or impurity of the water obtained from that portion of the Thames where the Dreadnought lies, seeing that it has no reference to the supply of London?—What I stated with regard to the Dreadnought was, the composition of the mechanical matter; it was the only mechanical matter from the Thames I had examined.

1424. Is there any water in the world without some impurity in it?—I have not met with any, except distilled water.

1425. I think you stated that Thames water at London Bridge contains, at high water, 113¼ grains of impure matter in a gallon, and at low water only 32 grains?—Yes.

1426. Is not it the fact that at low water the whole of the sewers are pouring their contents into the bed of the river?—No doubt.

1427. Then how do you account for there being so much less impurity in the river at low water than at high water?—Because at high water you have the tidal sea water intermingled with the water in the river.

1428. The Committee are to infer that of the impurity which exists at high water, three-fourths is referable to the admixture of sea water and of saline matter?—There is a considerable quantity due to the sea water, and likewise a considerable quantity due to the sewage; because, instead of the sewage being carried away rapidly, it is carried upwards by the tidal wave.

1429. Would not the greater proportion of sewage demonstrate itself in the water when, at low water, all the sewers of London are pouring their contents into the bed of the river?—If a large quantity of this sewage is withheld and retained, that would not be the effect.

1430. Is there anything prejudicial to health in the saline impurities which appear to constitute so large a portion of the impurities which are found at high water?—It is not such water as we should use, I think.

1431. In the component parts of those saline impurities there is nothing prejudicial to health, is there?—Not in small quantities.

1432. You have stated that you believe the water for the supply of the metropolis might be very much improved by the application of lime?—I believe it might be very much softened by that means.

1433. Mr. *Sheridan.*] Would lime be sufficient to remove the impurities produced by nitrates in the water?—No, it would not remove nitrates.

1434. Mr. *Moffatt.*] You are probably aware that the amount supplied to the inhabitants of London is no less than 44 millions of gallons a day; how would you propose to apply Dr. Clark's process to so large a quantity of water as that?—I believe that to be entirely an engineering question; I am quite satisfied with the chemical part of it.

1435. Has not it occurred to you that it may be applicable to a very small quantity

quantity of water, but be perfectly inapplicable, or even dangerous, if applied to large bodies of water?—I have been assured by engineers who have purified water upon a large scale that it is perfectly practicable upon any amount of water.

1436. Viscount *Ebrington.*] It has been applied on a large scale, has not it?—Yes, at Plumstead, near Woolwich.

1437. Mr. *Moffatt.*] What is the extent of the supply of the Plumstead Water Company?—I believe it is a good many thousand gallons a day.

1438. Viscount *Ebrington.*] You are probably aware that more than half the present water supply of London is pumped into the town to run down the sewers, without having been used for domestic consumption, or for the purpose of washing the streets?—Yes.

1439. Mr. *Moffatt.*] The boiling of water, I presume, discharges a large amount of carbonate of lime in the water, does not it?—Yes.

1440. So that by the process of boiling you get rid of much of the objection to the hardness of water?—So far as lime is concerned you get rid of a good deal of the carbonate of lime, but not of the sulphate of lime.

1441. Does not the same process get rid of many other impurities?—Yes.

1442. Viscount *Ebrington.*] At the same time there is a large quantity remains; is not the presence of the curd we find in soap every day when we wash our hands in London is due to the presence of lime and magnesia?—Yes.

1443. Filtration by charcoal has also been employed on a very large scale, has not it?—Yes.

1444. And though it is an engineering question whether that process or Dr. Clark's process is or not applicable to the water supply of London, or whether the water is to be taken from the Thames or the Surrey hills, or from the chalk, there is no doubt, is there, that the application of those two processes, if you get hard water and impure water, will remove to a considerable extent that hardness and that impurity?—No doubt.

1445. *Chairman.*] Are you aware that in the metropolis, by the Act of 1852 all the companies of London are required to filter their water after this year?—Yes, I am aware of that.

1446. Of course any experiments upon the water, drawing comparisons between the waters of the different companies now will, of necessity, be very materially interfered with, and of less value after this filtering process has been carried out?—Certainly.

1447. Mr. *Villiers.*] That is consistent with what you have said already, because it is something which is to be; it has not been?—Yes; and for omitting it they are liable to a penalty.

1448. You are aware that that has not yet come into operation, therefore it consists with what you have said, that there is a difference in the character of the water supplied by the different companies?—Yes; at least it was so on the 7th of July, when I made my last examination.

1449. Are we to expect a decided improvement in the water from the companies being compelled to filter it?—So far as mechanical impurities are concerned.

1450. When does the Act come into operation which compels them to perform this operation?—I think in August next.

1451. Viscount *Ebrington.*] Will filtering water through charcoal remove a good deal of the organic as well as the mechanical impurity?—I have some doubts of that; it removes some colouring matter; I have found it to do that.

1452. Does not it remove any taint from fresh decomposed animal or vegetable matter?—Yes, it will remove any decomposing matter which gives out a gas which can be absorbed by charcoal.

1453. Water purifies by the process of oxidization, does not it, which goes on within it?—Yes.

1454. So that though the Thames takes the drainage of three quarters of a million of inhabitants above the place where the water companies now take it, the impurity of the river at that spot is not quite what, without that consideration, might be expected to arise from the amount of animal and vegetable refuse from so large a population?—Quite so.

1455. It is impure to a considerable extent, but not so impure as but for this process of oxidization might be anticipated?—Certainly.

1456. *Chairman.*] With respect to the adulteration of drugs, can you give any

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any information to the Committee. In your opinion, does adulteration prevail very extensively?—Very extensively.

1457. Do you consider the adulteration itself of a very injurious character?—Yes.

1458. It applies to some of the leading articles of the Materia Medica, does not it?—Yes.

1459. Mr. *Villiers.*] Have you prepared any list of the adulterations which are commonly practised?—I have here a specimen of the white precipitate of mercury (*producing the same*) which came into my hands the other day. In St. Thomas's Hospital every drug, before being purchased, is subjected to examination, and we reject every one which contains any amount of impurity. I have here a specimen of the pure and of the impure article. You can scarcely detect the difference by the eye; they are the same in appearance, but the impure one contains a large quantity of chalk mixed with it.

1460. *Chairman.*] Is this used extensively in medicine?—To a considerable extent.

1461. What would be the result of the adulteration by chalk?—The effect expected would not take place.

1462. Mr. *Villiers.*] All the drugs are submitted to some examination, are they, at St. Thomas's Hospital?—Every one.

1463. Have you often to reject drugs?—Very frequently indeed; I may say that one-third of the substances I have examined I have rejected, either from impurity or adulteration.

1464. Do you contract for drugs and by tender?—At one time I was asked by the authorities of the hospital to name a druggist, but not being very familiar with druggists, I made inquiry, and mentioned the name of one who I was told would supply pure drugs. The very first order we gave him we obtained a preparation which contained two or three substances which ought not to have been present; the name of the substance was "liquor ammoniæ," as it is called in the Pharmacopœia; since then all the drugs are sent in by different druggists, marked by letters, so that we keep the best, and reject the worst.

1465. Have you any test at the hospital other than this examination; have you a druggist you can rely on?—We have a drug committee; they make out a list of substances required, and we send a copy of that to the best druggists' houses in London, and then we select from the specimens they send in the best samples.

1466. *Chairman.*] Why do not you purchase from Apothecaries' Hall, where, we understand, the drugs are very pure?—We consider that to employ only one trader would be a sort of monopoly; we like a little more free trade.

1467. Mr. *Villiers.*] If by accident in the case of a monopoly you should get the best article, is not that wise policy on the part of the hospital?—It is to a certain extent.

1468. It is the fact, is not it, that they do not venture to send out any drugs which are not pure?—I have no personal experience, as I abstain from asking the names of the parties who supply the hospital.

1469. Anybody supplying such an hospital as St. Thomas's with impure drugs must do it at very considerable risk, must not he?—If you have such impure articles sold by a large number of druggists, it is very difficult to make a distinction.

1470. The system must be very inveterate, must not it, for them to supply bad drugs even to an hospital; what chance has the individual customer of a druggist, if St. Thomas's Hospital is not safe?—I think it is a very bad system.

1471. Do you infer from that system that the supply of impure drugs is very general?—I think it is very general.

1472. Is the drug committee permanent at St. Thomas's Hospital?—Yes.

1473. Was it established for the purpose of ascertaining whether those drugs were pure?—The rules of the institution provide that there shall be a drug committee.

1474. Are you speaking on this subject from any more general experience than that derived from your connexion with St. Thomas's Hospital?—Yes; I may mention that in the year 1838 I gave evidence before a Committee of the House of Commons on this very subject, and a great many of the substances which I then pointed out as being impure and adulterated, still continue in the market

market; at that time the subject was taken up with as much vigour as at the present moment.

1475. Was anything done in consequence?—I am not aware.

1476. There was no check provided by the Legislature, and the thing continues still in practice?—Yes, just as it was then.

1477. *Chairman.*] What was the immediate object of that Committee?—It was on the Poor Law Amendment Act, with regard to the remuneration to medical officers of unions.

1478. Mr. *Villiers.*] The custom is to attend the poor and supply medicine by contract?—Yes.

1479. Have you any knowledge of the character of the medicines which are supplied under that system?—From my general knowledge of the drug trade I believe they are not likely to be the best drugs.

1480. I suppose there is some difference of price between the best drugs and those which are inferior or adulterated, is not there?—I have been told that there are druggists, at least one druggist, who would sell any powder you pleased at 36 *s.* the cwt.

1481. Do you mean any powder, whatever way ordered, he would sell at the same price?—Yes, he had powders at the price.

1482. Whatever the original price of the pure article?—Yes; when you asked him if that was the best article, he said it was the best he could sell at that price; the fact being, that he could dilute down by extraneous matters any drug you pleased to any value.

1483. Is that practically a fraud?—Certainly.

1484. When a man says it is the best he can sell at that price, the purchaser may suspect that it is not the best of the sort, and may suppose if he wants the best he must pay more?—He ought to know that.

1485. The fraud which is usually practised is, that men pay for a certain article, but what they pay for is so mixed up with inferior articles, that it is a very different thing from what they believed they were buying?—Sometimes the article does not contain any of the substance by the name of which it is called.

1486. Do you know any instances of that kind?—I have known extract of opium mixed with extract of senna, and from 30 to 60 per cent. of water; that was sold as opium.

1487. That, of course, if prescribed in any case, would disappoint a medical man?—Of course; I have here a sample of scammony (*producing the same*); this is the purest scammony we have been able to get in London, and yet that contains a large quantity of starch, and to show that starch is not a necessary ingredient of scammony, I have here (*producing the same*) a specimen of scammony without any starch, but mixed with half its weight of chalk, which I have had for many years in my museum.

1488. *Chairman.*] You appear to draw a distinction between adulterations and impurities in drugs; what do you mean by that distinction?—In the case of some medical substances they are not purified; certain bodies are present in them which ought to be removed, but are not, and those articles in consequence do not correspond with the Pharmacopœia.

1489. The manufacture is imperfect without there being any absolute adulteration?—Yes; but it comes practically to the same thing. You have a quantity of matter present which ought not to be there. For instance, carbonate of potash, a sample of which I analysed, was sent to me as a good article, and it only contained 78·37 per cent. of carbonate of potash.

1490. Mr. *Villiers.*] Was that supplied to the hospital?—Yes, and rejected.

1491. *Chairman.*] Do you find opium largely adulterated?—I think it is not more adulterated than many other things.

1492. What are the drugs which are most commonly adulterated?—Rhubarb is very frequently adulterated with flour and turmeric. I have had examples of that myself in medicines which have been sent for the supply of ships going abroad. Where a hundred weight contained 14 lbs. of flour, and eight ounces of turmeric, it was considered to be a good article.

1493. Could that be easily detected by a chemist?—Yes; I threw a large quantity of it away at one time, which was supplied to the East India Company in a department under my charge.

1494. Mr. *Otway.*] Do you know whether the opium which is adulterated is

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opium furnished by the East India Company, or Turkish opium?—Adulterators do not make any distinction of that kind.

1495. Mr. *Moffatt.*] Has not there been a large extent of adulteration of opium before it is imported into this country from the East Indies?—I do not think it is the case with the East India Company's opium in their factories; I speak of Bengal.

1496. Have you ever analysed any?—Yes; I have, and I believe it is the purest opium you can get, as it leaves the Bengal factory; they have chemists to direct the manufacture.

1497. Mr. *Otway.*] Dr. Hassell, in his evidence here, has stated that opium comes to the factories in the East Indies already adulterated, having been adulterated by the vendor of the article?—I am not aware of it.

1498. Have you analysed East India opium, and found it not to be adulterated, and have you analysed Turkish opium, and found it to be adulterated?—I do not believe it is adulterated in the Company's factory.

1499. I understand you to say that the opium which comes from the East India Company is not adulterated?—I do not believe it is adulterated before leaving the factory.

1500. Therefore it follows that the opium which is adulterated is that which is supplied from Turkey?—But it may be adulterated after it comes to this country; as it comes from the druggist we find it often to be so.

1501. Mr. *Moffatt.*] Your belief is that it is pure when it is imported?—I believe when it leaves the Company's factory, it is so.

1502. When it arrives in this country, can you say, from your own examination, that opium is pure?—So far as I have analysed it, it is often impure.

1503. Have you made several experiments upon it?—Yes; but I speak rather from my own knowledge of the way in which the Company's factories are conducted.

1504. You do not know of your own knowledge in what state the Company's opium arrives in this country?—No; the Company's opium is generally sent to China.

1505. You said just now that the Apothecaries' Company had a monopoly; are the Committee to understand that they have the monopoly of selling pure drugs, or what is the nature of their monopoly?—The Apothecaries' Company, I believe, is highly respectable, consisting of a large number of members of the profession; medical practitioners; but I used the term monopoly in reference to confining orders to one house.

1506. Mr. *Villiers.*] Will you mention any other drugs which are commonly adulterated?—Liquorice powder has been often found to be composed of 56 lbs. of sugar, 166 lbs. of barley meal, and 7 lbs. of turmeric.

1507. *Chairman.*] Then there was positively no liquorice whatever in that article?—None whatever. With regard to tonics, which are used very extensively in medicine, I have found that citrate of iron and ammonia, which ought to afford 34 per cent. of peroxide of iron by analysis, only contained 20½ per cent. The tincture of sesquichloride of iron, which ought to contain 30 grains in the ounce of sesquioxide of iron, I have found to contain only 25. When I sent it back, I got another, which contained 35 grains in the ounce. In one sample of hydrocyanic acid, which ought to have contained 2 per cent., I found only 1·32, and in another sample I found 2·38. It would have been impossible, therefore, for any medical man to have depended upon that; it would not have produced the effects which he intended in the first case, and in the second case it might have produced dangerous results. The peroxide of iron I have found to contain alumina and lime; spirits of nitric ether I have frequently found to have a specific gravity of ·847, instead of ·834. Liquor ammoniæ fortis I have found to have a specific gravity of ·875, instead of ·882, and frequently I have found sulphuric acid in it, and carbonic acid, and in one sample I got lime, sulphuric acid, and carbonic acid. Calamine, which I recollect being very much used in surgery, but which has been very much less used of late, I have found to be a preparation of sulphate of baryta, chalk, and ochre; instead of being carbonate of zinc, it contained not a trace of zinc. At St. Thomas's we have had a great many samples of that kind, which were all rejected. I have had to send back a sample containing 6½ per cent. of oxide of zinc, and in one case 57·76 of oxide of zinc. Two samples I have found to contain white lead; those of course were all adulterations.

1508. Mr.

1508. Mr. *Villiers.*] Not accidental?—No.

1509. I presume those which you are referring to are not particular samples which you met with with accidentally, but they are cases in which drugs were supplied to the hospital?—Yes.

1510. Are the experiments you have so made, of recent date?—All within the last 18 months.

1511. How long have you been connected with St. Thomas's Hospital?—About two years.

1512. Viscount *Ebrington.*] Have you often heard medical men complain that the uncertainty they felt as to the way in which their prescriptions would be made up, has greatly embarrassed them in their treatment of their patients?—I have; it is a constant complaint.

1513. When they write a prescription, they do not know whether the medicine, as made up, will really contain the elements which are there specified?—They do not.

1514. And that is a feeling which is pretty general in the profession, is it?—It is.

1515. Mr. *Villiers.*] It is customary to name some chemist, is it not, where they wish prescriptions to be made up?—It is very common.

1516. Have you any suggestions to make to the Committee as to the means by which ordinary people can tell whether the drugs they have bought are pure or not?—I know of no way but by having public inspectors.

1517. A person properly qualified to declare whether the drugs are good or not?—Yes.

1518. The knowledge of such an officer existing, you think, would have a great effect in preventing fraud?—Yes.

1519. It would be injurious to a man's character to be detected in selling those drugs?—I have no doubt of it.

1520. Would there be any difficulty in carrying out such a scheme; must the inspecter be a very profound chemist?—I think there might be a great many persons all over the country to whom questions of this kind might be referred.

1521. Do not you think the inspector must be a public officer, and independent of local influence?—I think there might be one or more public officers to whom questions of difficulty might be referred, just as you have in the Excise, of which I have a considerable knowledge. There they have no difficulty whatever in detecting the adulteration of tobacco.

1522. Have you acted occasionally for the Excise?—Yes.

1523. The Excise officers are not scientific men, are they?—The present Chairman of the Board of Excise has introduced a scientific education among a certain number of the more advanced Excise officers; they are educated at the expense of the Government, and it has had a very beneficial effect.

1524. Do you know whether they have been found to be sufficiently qualified?—Whenever they are in any difficulty they refer to some one who has had a large experience.

1525. Do you know from what class of persons they are generally drawn?—They are ordinary Excise officers, who have passed an examination before their admission to the office.

1526. You consider the adulteration of drugs to be very great, and the public are helpless without some such system of inspection as you have indicated?—Perfectly helpless; and I should despair of any beneficial result from this inquiry, unless some check of that nature is introduced. Indeed I apprehend that otherwise we are giving instructions to adulterators. It is no new power desired, because such a power already exists; but it requires to be applied to practice by an independent body such as the Board of Health.

1527. Have you any doubt of the generality and extent of the evil?—Not the least.

1528. It is, of course, a great evil that drugs should be thus adulterated?—An enormous evil.

1529. Viscount *Ebrington.*] The public, you think, is perfectly helpless; the principle *caveat emptor* may sound very well in Parliament, but it is perfectly inoperative as regards the adulteration of drugs or food?—Perfectly so.

1530. Generally speaking, no one is inclined to victimize himself for the good of the public by taking on his own shoulders the expense, and annoyance and

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trouble of exposing and prosecuting fraud of that kind?—It is impossible that it can be done in that way.

1531. Your belief is that it would be a sound economy if some one were deputed by the public to protect it from adulteration in its food and drugs, just as the officers of the Mint protect it from falsification of its money?—Exactly so; I conceive it would not only be a great means of preventing fraud, but would likewise conduce to the public health.

1532. And morality?—And morality.

1533. Mr. *Moffatt.*] Referring to the samples in which you have found such extensive adulterations, were they samples submitted to St. Thomas's Hospital?—Many of them were; but I should guard myself by saying that a number of them were not, particularly the powders.

1534. How were those samples obtained?—Simply by requesting different houses to send in samples.

1535. The best houses in the drug trade?—I believe they were.

1536. Wholesale druggists?—Various druggists.

1537. Were they wholesale or retail druggists?—I believe they were both. When I recommended one I found I had got such a bad article that in future I requested that I should not be furnished with the names of the persons who supplied the drugs.

1538. With regard to the samples which were sent to St. Thomas's Hospital, I understand you to say they were not the samples which you found most generally adulterated?—I mentioned that one-third were impure of those sent to St. Thomas's Hospital, that is to say, they were not such articles as are directed by the Pharmacopœia.

1539. With regard to the other samples, were they obtained from wholesale or retail druggists?—Most of the powders had passed through the hands of drug grinders.

1540. The drug grinder, not being a dealer in drugs, it was the retailer whom you obtained the samples from?—The drug grinder gets them by their being sent by the wholesale druggist to him to grind, and he returns them to the person who employs him.

1541. Does the drug grinder give samples to persons who apply for them?—No.

1542. I understood you to say you obtained them from the drug grinder?—I said they had gone through the hands of the drug grinder.

1543. Can you inform the Committee whether those samples which you analysed were obtained from retail or wholesale druggists?—I cannot at this moment.

1544. What means were taken to be sure that the quality of those samples represented the average quality of drugs supplied to the trade in London?—At the time when those powders were examined I had parties with me who had been present at the manufacture of similar articles.

1545. My question rather has reference to articles which were not powders?—A great many of the other articles I may guard myself by saying were impure.

1546. Did you take any steps to satisfy yourself that those were not exceptional cases?—I took them as they came.

1547. Did you obtain the samples from a great variety of druggists in London, or were they samples sent to you to analyse?—I can give you 150 cases, and out of those, one-third were impure; our drug bill at the hospital amounts to between 2,000 *l.* and 3,000 *l.* a year.

1548. Is it not possible that all those samples of drugs may have come from one druggist?—I know they did not; sometimes I know they were obtained from as many as ten different druggists.

1549. Mr. *Villiers.*] You said in some cases the parties who had manufactured the adulterated drugs were present?—They gave me the information respecting similar adulteration; they gave, in fact, the prescription for making the article.

1550. Did they speak of any manufacture of them as existing upon a large scale?—Yes.

1551. Mr. *Moffatt.*] Can you give the Committee any information with regard to the manufacture of impure drugs?—There is a gentleman who would be willing to give evidence upon the subject, who has been engaged in pharmaceutical

tical manufactures (Mr. Scanlan); I would recommend the Committee to hear him if they wish to obtain information upon the subject.

1552. Viscount *Ebrington.*] You are confirmed in your idea that this adulteration is not exceptional by the very general opinion of the profession upon the subject, are you not?—I think so.

1553. Mr. *Moffatt.*] You were understood to say, that the Apothecaries' Company enjoys a species of monopoly; will you describe to the Committee what monopoly it is which they enjoy?—I am not familiar with the Apothecaries' Company, but I believe the Company consists principally of general practitioners.

1554. How does that give them a monopoly?—What I said was, that to get all our drugs from one druggist would have been a monopoly; I make no reflection upon the Apothecaries' Company, whom I believe to be a very respectable body.

1555. You produced a specimen of scammony, and said that it was adulterated, but that it was the purest which could be obtained in London?—The purest that I have been able to obtain.

1556. Have you applied at Apothecaries' Hall for scammony?—I do not know.

1557. You did not take any steps to know whether they sold purer scammony than you could obtain elsewhere?—No; I requested the authorities of the hospital not to inform me who were the dealers, so that I gave a perfectly unprejudiced opinion.

1558. Do you know what steps were taken in reference to the samples of scammony, to understand that it was the purest which was sold in London?—I have examined six specimens at a time from different druggists, and I was informed they were obtained from the most respectable druggists in town.

1559. You state your belief that for the general purposes of detecting these adulterations, men employed by the Excise, with some little instruction, would be competent; do you know what kind of examination they go through before being admitted to perform the duties of excisemen?—No. I think inspectors should be medical men distributed throughout the country, who might act in concert with medical authorities, conversant with chemical and physiological investigation, in the metropolis, and connected with the Board of Health probably.

Mr. *Thomas Blackwell*, called in; and Examined.

1560. *Chairman.*] YOU are, I believe, a wholesale pickle and sauce manufacturer?—I am.

1561. Of the firm of Crosse and Blackwell?—Yes.

1562. Your establishment is one of long standing, is not it?—I believe it is one of the oldest in the trade.

1563. Can you inform the Committee what has been the practice in the manufacture of pickles and sauces of various kinds?—The practice with respect to pickles for the last 35 years has been to use copper vessels in boiling the vinegar; it requires the vegetables to be scalded first, and then they remain in the vinegar two or three days, so that the vinegar takes up a portion of the copper. The same thing is done two or three days afterwards, and is repeated till the vegetables become of a green colour.

1564. The special object of that process was to obtain such an admixture of copper as to colour the fruits and vegetables?—You did not get your pickles of a good colour unless the vinegar was boiled several times. The first time that was done the pickles turned yellow, the next time green; and if you wished them to be of an extra good colour you had to repeat the process till you got that bright colour.

1565. From what did the good colour arise?—From the vinegar being boiled in copper.

1566. The object of the process was to take up a sufficient quantity of copper to colour the vegetables?—There is no doubt that was the case.

1567. Have you abandoned that method?—After the articles which appeared in the "Lancet" four or five years ago we abandoned it as far as possible. We have had iron vessels made, which are coated with glass, and likewise we had one silver vessel made, but we found silver would not do. The acid and the salt

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together turned everything black, and we could only use it for that which contained acids alone.

1568. Do you mean to say that you no longer use copper vessels in the preparation of your pickles?—We are compelled to use some large copper vessels, but we only boil the vinegar in them once, and therefore the pickles are of a brown colour; we have iron vessels made, enamelled with patent glass; but we cannot get them made to hold more than from 12 to 15 gallons; we have had one made to hold 100 gallons; but from the process to which it is subjected the rivets of the iron vessel break, and it becomes useless for the purpose required.

1569. Are you aware whether any change has taken place in the colour of pickles made in other houses in the trade?—I think in some of the respectable houses there is an alteration, they are not made so green as formerly.

1570. I believe you yourself have taken some means of apprising your customers that you have ceased to use this process?—In respect to pickles and fruits, we attached a label to the bottle, which we continue to use, on account of the bad appearance of the articles; at first it was rather prejudicial to us, but since that we have found it rather advantageous.

1571. Do you think the public are now misled as much as they used to be with respect to the green colour?—No.

1572. Mr. *Kinnaird.*] Did you find a considerable falling off at first, when you ceased to use those means of colouring the pickles?—In the first instance we found a considerable diminution, and particularly abroad; parties wrote to us to say they requested their goods green as formerly. Now they are satisfied, and we do not have the same difficulty.

1573. Have you a large export trade?—A very large export trade; we employ 200 people in our manufactory.

1574. Do you believe from your own knowledge that the effect of that colouring process was prejudicial to the health of the people?—I do not think it was prejudicial, provided the parties in the factory were careful. If they were not, I consider it might be prejudicial; it requires a good deal of care.

1575. *Chairman.*] You thought there was something prejudicial, I presume, or you would not have abandoned your former process of preparing pickles?—We thought they were more wholesome the other way, and we abandoned it immediately.

1576. Is it true that you apply any colouring matter to sauces?—The only colouring matter that we use is in red sauces; in essence of anchovy, for instance.

1577. What is the colouring matter that you use there?—It is bole armenian.

1578. For what purpose is that used?—Anchovy itself is of a dark brown when it is imported, and when pounded up in a mortar it is a very unsightly colour, an unpleasant brown colour, and it has always been a custom with the trade to colour it, and to make it a bright, handsome-looking sauce; and the proportion of colouring matter used has been in proportion to the depth of colour required to be imparted.

1579. What proportion of bole armenian is used?—The largest proportion to produce a good colour is 10 pounds of bole armenian to 100 gallons of anchovy sauce, which is about one per cent. If it is made rather of a brown colour we use only one-third of that quantity.

1580. Suppose you were to offer it for sale of the natural colour, as you have represented it, the public would not purchase the article?—We have done so since last Saturday; some object to the altered appearance, others do not. We issued a circular to say that we should not any longer sell the red anchovy, as before.

1581. Why did you do that?—On account of the exposure; it is more to our interest to sell a pure article than an impure one, if parties will really take it.

1582. There was nothing deleterious in this colouring matter, was there?—No; the substance is sometimes used medicinally, and contains a very large proportion of iron; it is a red earth, very finely powdered and then washed. We issued a circular to our customers, explaining our reason for discontinuing its use in the preparation of our anchovy paste and sauce.

1583. Mr. *Villiers.*] Did you sufficiently inform the public, in your circular, that there was nothing dangerous in the colouring matter before?—We considered

sidered there was nothing dangerous. In the anchovy paste there is a quarter of an ounce used to 36 lbs. of fish.

1584. Did you say that some of your customers had refused to take the pure article?—We have received information from our travellers that the trade generally object to it. I have sent samples to 12 of the clubs we serve, to ask their opinion; I have had only one reply, and that is rather unfavourable; it was said the colour would be objectionable.

1585. Is there any difference in the taste?—Yes, the taste of the uncoloured sauce is better, if anything.

1586. You said you had sent to 12 of the clubs at the West-end?—Yes, and only one has taken any notice of it at present.

1587. How long ago did you send these samples?—On Monday last.

1588. Mr. *Kinnaird.*] To your knowledge, has red lead ever been employed for the purpose of colouring by yourself or any other manufacturer?—Never by ourselves.

1589. Have you heard of it in the trade?—I should think not; it would be pernicious, and the other would answer every purpose.

1590. Viscount *Ebrington.*] You believe that the flavour of the brown and less attractive looking sauce was decidedly better than the other?—No doubt of it.

1591. Have you sent circulars with respect to any other article in which you deal in consequence of the statements which have been made to this Committee?—No; three years ago, when the "Lancet" first took up the question of pickles, we did our green gooseberries in the same way as was the custom of the trade, that is to say, the liquor had to be boiled in copper to make them green, but we immediately gave up the practice, and have not allowed them to be done so since.

1592. You can only speak, of course, to the custom of your own manufactory?—That is all.

1593. Mr. *Kinnaird.*] Before those articles appeared in the "Lancet" did you ever have any complaints from customers or private individuals of the impurity of the article?—I never recollect a complaint, and I have often wondered that we have not had complaints, because, when a gooseberry pie was cut it appeared an unnatural green.

1594. *Chairman.*] Are you aware that fish, which purports to be anchovy, is sometimes by no means anchovy?—There is a large quantity of fish imported from Holland which are an inferior description of anchovy.

1595. Are they really anchovies?—They are a small fish; I cannot say whether they are anchovies, but they have no flavour.

1596. Mr. *Villiers.*] You are not prepared to day to give any contradiction to any evidence which has been given before this Committee except as it might concern your own business?—I am not prepared to give any contradictory evidence.

1597. Mr. *Kinnaird.*] From your knowledge of the trade, is not damaged fish frequently used by the inferior houses?—I think not by respectable houses. If we have inferior fish we sell them to some one at the east end of the town, and they are manufactured or done something with. We do not think it is done by the respectable trade.

1598. Viscount *Ebrington.*] Is what you sell only an inferior quality of fish, or is it damaged?—If we had an inferior quality of anchovies, we should sell them off, but damaged fish we should throw away.

1599. Mr. *Otway.*] You admit that those adulterations of pickles were of a deleterious character to some extent?—I cannot say that they were of a deleterious character; going through copper several times, no doubt, is not so well, but I cannot say that it was of a deleterious character.

1600. Do you consider that in the series of years when you were selling those articles to the public with this colouring matter introduced, and the other matters which are more or less deleterious, because the public did not make any complaints of what they purchased you were conscientiously dealing with the public?—The parties would not buy them unless they were of this colour.

1601. Would you consider it right to sell an unwholesome article to the public because the public desired it, not knowing that it was unwholesome?—We did not consider it to be unwholesome; if not done properly, it might be unwholesome; but we never considered it to be so. I have been over a manufactory at Paris where preserved fruits are done, and their colouring is obtained by the

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number of times the fruit is put through the boiling process to get the colour of green gages.

1602. Do you consider that you were dealing faithfully with the public in selling to them for a series of years an article which was adulterated which they did not know to have been so?—We considered them to be wholesome till we saw the report in the "Lancet;" immediately we saw that we changed our processes.

1603. Mr. *Moffatt.*] In your preparation of pickles there was no adulteration, was there?—No; the vinegar was submitted three or four times to a copper vessel; each time it went into the vessel by boiling it took off some of the copper, no doubt; now the only difference is that it is only boiled once.

1604. Mr. *Kinnaird.*] Among the various sauces which you prepare, do you prepare Soyer's sauce?—Yes.

1605. There is nothing there but the genuine article, is there?—There is no sauce, with the exception of the essence of anchovy, essence of lobsters, essence of shrimps, and tomato sauce, which has any colouring in it in our manufacture.

1606. Have not you heard of a spurious soy sauce which is made in this country of treacle and various other articles?—Soy is imported from China, and I believe the soy made in China is made from sugar and some bean; I cannot say myself that I ever saw any manufactured in this country.

1607. Have you any trouble by other people counterfeiting your sauces?—We have; they are made in Holland and in Paris.

1608. Do you find them to be made genuine in those cases?—They are quite of a different quality; at the present time we have an instance of a party coming to us and complaining that our stamp has been sent to him at Hamburg in mistake; he has promised to send it over to us; as I understand they are manufactured and exported there with our name on them.

1609. Mr. *Villiers.*] I suppose these adulterations which take place in your business are positively injurious to you?—They are; it makes the consumption less.

1610. I presume you would have no objection to a system being adopted which would check them?—We should prefer it; we should continue to make this essence of anchovy; but I am still of opinion that many parties will prefer the red anchovy.

1611. In other things it is a positive injustice to the respectable portion of the trade, is not it, the adulterators underselling them unfairly?—People can always tell the quality of an article by tasting it.

1612. Do not they find it answer to adulterate such articles?—Not in most cases, I think.

1613. You do not speak to that from any general inquiry?—No.

1614. Viscount *Ebrington.*] Do you believe that in the respectable portion of the trade there would be any objection to such a system being adopted as would put a stop to adulteration?—There would be a prejudice against it in the first instance, but in a short time that would wear off.

1615. Mr. *Kinnaird.*] I gather from your evidence that the less attractive form of the article will be a sort of guarantee to the public of its being genuine?—It will; if the public will only take to it, the evil will cure itself very shortly.

1616. Mr. *Moffatt.*] Are the Committee to understand that the most successful houses in your trade are those who are least suspected of adulteration?—I think it is the general case with any trade.

1617. That is the general bearing of trade?—It is.

Theophilus Redwood, Esq., PH.D., called in; and Examined.

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1618. *Chairman.*] YOU are, I believe, Professor of Chemistry to the Pharmaceutical Society?—I am.

1619. Your position has, of course, afforded you many opportunities of examining into the qualities of drugs?—It has. I have been for the last 14 years Professor of Chemistry and Pharmacy to the Pharmaceutical Society, and for the greater part of that time I have been Curator of the Museum to the Society. The museum of the society consists of specimens of drugs and medicines in the different states in which they are met with in this country, and also abroad. It is, at the present time, one of the most extensive and complete museums in existence, whether in this country or any other country, in regard to

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to the variety and value of the specimens. I have had considerable opportunities during the formation of this museum, and also in other respects, from my position as professor there, of observing the quality of the drugs which are used in the country. The members of the Pharmaceutical Society are in number about 3,000 or more, and I am frequently applied to by them, in cases of suspicion, as to the adulteration of drugs. I may say, moreover, that the subject is one which has constantly occupied the attention of the Society, and has been brought specially under the notice of the Society. It has been discussed at the meetings of the Society, and all those connected with it have promoted in every way the bringing to light cases of adulteration. This has extended through the period I have mentioned; I should wish to make a few observations in reference to what struck me in some of the evidence which has already been given before this Committee.

1620. Mr. *Villiers.*] You have been present and have heard the evidence, have you?—I have. It has appeared to me that there has not been a sufficient distinction drawn by the gentlemen who have given their evidence here between impurity and adulteration. An article may be impure without being adulterated. With reference to the chemical products which are used in medicine, and which are also used in the arts and manufactures, absolute purity is unattainable, generally speaking; it is either unattainable, or it is attainable at a cost which renders it undesirable. As a general rule, they cannot be got in a state of absolute purity. Now, the degrees of purity of such substances, as they are met with in commerce, will chiefly depend upon the nature of the demand for them, and the means for their production. The articles will be produced in such a state of purity as will suit the particular purposes to which they are to be applied; and we find the production of those articles is considerably influenced (and we see daily evidence of this) by the nature of the demand for them. I will illustrate this especially by referring to two processes which have been very generally introduced into this country of late years, and which have exercised a very material influence upon the quality of chemical products. One of those processes is that of electro-plating, and the other is the process of photography. In electro-plating a salt is very extensively used, which is called the cyanide of potassium, but for that purpose it is not necessary that the salt should be in a state of purity, and the consequence of there being a large demand for cyanide of potassium for electro-plating has led to its being produced at a much cheaper rate than it was previously, but in a much less pure state. As it is now produced it is quite suitable for the purpose for which it is intended. It is principally employed for electro-plating; and the electro-plater looks principally to the cost of the article. It has been brought down to a low price, and in so doing a comparatively impure article has been produced, and this impure article has, to a great extent, superseded the purer specimens of cyanide of potassium which were generally met with in the country, because principally it was previously used in medicine.

1621. *Chairman.*] Are you aware that cyanide of potassium, however it may have been diluted or adulterated for the purposes you speak of, is now sold in such a state by chemists, that electro-platers themselves cannot use it, and in some instances are obliged to manufacture their own cyanide of potassium?—I am aware that in carrying out the process which I refer to, namely, the cheap process for its production, which is known as Liebig's process (for it was Professor Liebig who first suggested it), some manufacturers have produced what is called cyanide of potassium, in which cyanide of potassium is the exception, and all the other ingredients far overpower it. Such specimens would not be applicable to electro-plating; because, when it is used for electro-plating, though it is not necessary that it should be pure, it is only the cyanide of potassium which is contained in it that is available. Therefore a pound of cyanide of potassium, containing 50 per cent of the article itself, would have a value which would be proportionate to the quantity of cyanide of potassium contained within it. There is no doubt, and it is an admitted fact, that the use of this article for this purpose has led to the general adoption of this process, and to the deterioration of the product.

1622. Mr. *Kinnaird.*] Are the Committee to infer that this impure cyanide of potassium is now used for medicinal purposes which was manufactured for electro-plating?—Cyanide of potassium, at this present time, is very rarely used in medicine; previously to its introduction into electro-plating it was occasionally used for the production of hydrocyanic acid, and for that purpose it was very important that it should be in a state of purity; it is now very rarely used for

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the same purpose, and the pure is sought for. But if any gentleman were to send to a retail chemist's for the cyanide of potassium, the chances are he would get impure cyanide of potassium, because it is for that the great demand exists. Even now, by the retail chemists, in ninety-nine cases out of a hundred, it is sold, not for use in medicine, but for use in the arts, and the impure article for that object answers the purpose quite well; and in relation to the quantity of real cyanide of potassium contained in it, is much cheaper. The commercial value of the impure cyanide of potassium is about 3 *s.* 6 *d.* a pound; the pure cyanide of potassium cannot be got at less than about 1 *s.* 6 *d.* an ounce. I mention this to show that the degree of purity of this product would depend upon the nature of the demand. Here the demand is for an impure article and a cheap article, in which purity is not essential. I was going to mention another process, namely, that of photography, in which it is very important that all the chemicals used should be in a state of as great purity as possible; and the extension of the process of photography has tended very greatly to improve the condition in which the chemicals used in photography are met with in this country. I may refer to acetic acid, to bromide and iodide of potassium, and to pyrogallic acid; these things are all now required in photography, and as they must be pure, they are now in a much greater state of purity than they were before photography was introduced. The influence of the demand has improved the quality of the product.

1623. Mr. *Villiers.*] Are the Committee to understand you to lay it down as a rule, that when the demand is for a very pure article, and where it is necessary to be pure, then we may rely upon getting a pure article?—Undoubtedly.

1624. But in a case of indifference there is less vigilance, and then the impurity may be to a great extent?—Yes.

1625. *Chairman.*] I suppose we may assume that medical men are particularly desirous of getting the purest drugs they possibly can for admixture in compounding medicines?—In proportion as they are so the drugs supplied to them will be pure; I have no hesitation in saying further, that there is not the slightest difficulty in getting good drugs in any part of London, or in any part of the country; I wish further to state that it appears to me to be incorrect, and even absurd, to refer to impurities such as occur in such substances as carbonate of soda, carbonate of potash, nitrate of potash, Epsom salts, and the body which I have just mentioned, cyanide of potassium, as instances of adulteration. Those impurities I do not look upon in the light of adulterations; they are the result of the adoption of cheap processes for their production. Those articles as they are met with in commerce are in a sufficient state of purity for the purposes for which they are required; they are pure enough for practical purposes, and greater purity in those substances than the state in which they are now met with, would, as I conceive, be purchased at a cost which would be quite disproportionate to any improvement in the qualities of the substances. I will give an illustration of what I mean; I am now speaking of the use of these substances generally, because it must be borne in mind that these substances are used for other purposes besides medicine. I will take the case of carbonate of soda; carbonate of soda is made upon an immense scale in this country. It is used very largely, perhaps most extensively, in the manufacture of soap. If any law were enacted which should oblige manufacturers of carbonate of soda to produce it in a state approaching to chemical purity, the result would be, that the price would be so disproportionately enhanced that it would be a great injury to the public at large. Carbonate of soda, as it is met with in commerce, is certainly never pure. The process which is adopted is inapplicable for the production of the pure product. It is pure enough for the purposes to which it is applied; and even when carbonate of soda is used in medicine as carbonate of soda is met with in commerce, it answers every purpose that a medical man requires, and in no instance, I am quite confident, does any injury result to the practice of medicine from the impurities which are present; that is to say, provided the dispenser, he who deals in it, exercises the ordinary care and supervision which is generally exercised by all the respectable dealers in this article, and dispensers of medicine.

1626. Are you yourself a medical man?—No. I may state that I was educated as a chemist and druggist; I have been connected with the practice of chemistry and pharmacy for more than 30 years. I was apprenticed originally in the country; I know what the business of a country druggist is. I lived for many

years

years in one of the largest establishments in London. I have also been engaged to a certain extent in manufacturing operations, and for the last 14 years I have been a teacher.

1627. The object of my question, as you will readily see, is to test the value of your observations as to the effect of these adulterations when applied as medicines?—I presume so.

1628. Mr. *Kinnaird.*] I gather that you are connected very much, both from your previous history and at present, with gentlemen engaged in the trade of chemists and druggists?—Certainly.

1629. Is your evidence based upon the first class chemists and druggists, or have you spoken from the experience of chemists and druggists in the lower and more populous districts of London, where the inferior members of the trade often reside?—I have a very general acquaintance with the character and qualifications of those gentlemen; I have been engaged in the education of a large number of young men at the Pharmaceutical Society. Many hundreds have been under my tuition. I know pretty well what the qualifications of those young men are when they come up from the country, and what their qualifications are when they leave and establish themselves in business.

1630. Do you speak of the lower classes of those practitioners as well as the higher?—I do.

1631. Can you define where the practical purity of substances begins and ends; you have been saying that those substances which you have been speaking of are impure, but that they are quite pure enough for the ends for which they are employed?—With respect to the substances I have mentioned, which exist in commerce in very variable degrees of purity, for medical purposes the purest descriptions are generally used. But there are other purposes to which they are applied where that purity is not necessary. Therefore I say for the purposes to which they are applied they are pure enough; and in no case, even in the administration of medicine, is absolute purity required; and I may justify that by referring to the Pharmacopœia itself. The College of Physicians do not require absolute purity; they admit impurity in the tests they give for those articles. They are tests only which are intended to apply to certain extraordinary impurities, and not the ordinary impurities which are commonly met with in the substances.

1632. Mr. *Villiers.*] Are you now speaking of ordinary or extraordinary impurities in the evidence you are giving?—I am speaking of ordinary impurities; the states in which those substances are commonly met with in commerce.

1633. Chemical science would not admit of those substances being quite pure?—There are specific applications which are made of such substances as I have mentioned,—carbonate of soda, and carbonate of potash, and cyanide of potassium,—for which perfectly pure, or as nearly pure as possible, products are employed; analysis for example; and it is always customary to prepare carbonate of potash and carbonate of soda by special processes for that special purpose.

1634. The Committee are referring in their examinations to what may be termed fabricated impurities, impurities which amount to fraud; it has been stated here, that such adulterations are not uncommon; are those the cases to which you are referring?—I am referring to those cases which have been mentioned; I refer to what was stated by Dr. Normandy, who stated, for example, that carbonate of soda is adulterated with sulphate of soda; I do not consider that an adulteration, simply because carbonate of soda cannot be obtained without it by the process which is commonly adopted; carbonate of potash was stated to be adulterated with chloride of potassium; it is well known that that cannot be got free from it by the process by which it is produced upon a large scale. When it is first obtained, it consists of carbonate of potash, sulphate of potash, and chloride of potassium. It is purified to a certain extent by adding a small quantity of water to it, which dissolves the carbonate of potash and chloride of potassium, but leaves the sulphate of potash; we cannot deprive it of that small quantity of chloride of potassium, and the Pharmacopœia allows its presence. We could get pure carbonate of potash by another process, but it would be a very expensive one, and it is quite unnecessary, for we now have it pure enough. There would be no advantage, for the purposes to which it is commonly applied, in getting it in a great state of purity; at least, no advantage which would be proportionate to the increase of cost.

1635. *Chairman.*] Do you speak of medicinal purposes?—Yes.

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1636. I suppose it is sold without any reference to the impurity, but sold as a pure article?—It is sold as the purest article which can be made by the process by which the great bulk of it is produced.

1637. Is there not a great difference in the carbonate of soda which is sold in different shops?—Yes.

1638. Is that equally indifferent for practical purposes?—With respect to carbonate of soda, you may find in chandlers' shops, where it is sold for washing purposes, it contains a large quantity of sulphate of soda; but the price generally is in proportion to the deterioration in the quality, and the demand for it will depend very much upon the effect which the people who use it, find to be produced by it. They can buy that common soda for less than a penny a pound, and if it were purified the price would be enhanced beyond the increase in the improvement of the quality.

1639. We find that this carbonate of soda, without any reference to the price, is sold being of different qualities; is not this difference in quality sufficient to make a difference in its application?—To a certain extent it is; that which is used in medicine is of a purer description than that which is sold to washer-women.

1640. That which is used in medicine ought to be purer?—Yes.

1641. But that which is frequently bought as medicine is not pure enough; is not that the case?—I have no doubt that in some isolated cases carbonate of soda is met with as sold for use in medicine which is deficient in purity.

1642. You have no doubt of that?—No; but as a general rule, I believe, as it is sold by respectable chemists and druggists, it is sufficiently pure.

1643. Mr. *Kinnaird.*] Is not it true that medicinal substances sold in low neighbourhoods are sometimes adulterated to a considerable extent?—Yes; adulterations do exist. I shall come to take notice of them presently.

1644. Have you yourself bought substances in low neighbourhoods in order to arrive at the fact?—Yes.

1645. What is the result of your experience?—That some articles are occasionally met with in an adulterated state, but that there has been for many years past a great improvement in this respect; they are very much less adulterated now than they were some years ago. I consider that the proper remedy for that is the improvement of education and knowledge in the parties who deal in those articles, and those who consume them. Better information on the part of the public is wanted.

1646. Mr. *Villiers.*] What information on the part of the public could protect them against an impure drug?—I think the fact should be brought more prominently under their notice, where there is a great competition in price, that if they run the price down the quality will, as a general rule, become deteriorated.

1647. Are there differences of price for some articles sold in druggists' shops?—Very great differences.

1648. Does not that offer a presumption that there are impurities where they are sold very cheap?—There are differences in quality, unaccompanied by what may be termed impurities, in reference to the great mass of drugs; in fact, the whole of them. Drugs which are of vegetable origin vary very considerably; rhubarb, jalap, and all those ordinary drugs. Without resorting to adulteration you may get quite as great a difference in quality resulting from natural imperfections.

1649. That is not unknown to the party who sells the drugs, he knows the quality of the article in which he deals?—In reference to drugs, as well as most other articles, the public are accustomed to appreciate them in a great measure according to extrinsic qualities, and they very frequently overlook the more important qualities of the substance; in the case of soda, increased purity in the article is purchased at a cost which is greatly disproportionate to the improvement in the quality of the article; if, for instance, you were to take a shilling's worth of impure carbonate of soda, and a shilling's worth of pure carbonate of soda, the shilling's worth of impure carbonate of soda would contain more available matter than a shilling's worth of pure carbonate of soda; therefore the man who wants to get the most for his money, will buy frequently the cheapest and the least pure article; he gets for it a larger quantity; he gets a larger quantity of bulk, and also of strength, and I do not conceive, therefore, that it would be at all to the advantage, but greatly to the injury of the public, and the lower classes especially, if there were any law which prevented the sale of any articles than those which were in a certain state of purity.

1650. The

1650. The Committee are speaking of the use of this particular article for medicinal purposes; soda is sometimes taken to neutralise acid in the stomach, is not it?—It is.

1651. Supposing a person is told by his doctor to take so much soda for that purpose, he goes to one shop and gets a pure article, he goes to another shop and gets an impure article, the prescription being uniform as to quantity; are the Committee to understand that it does not signify whether he takes that uniform quantity of the impure article, or the pure article?—I do not admit, in the first place, that there is that disparity in the quality of the article when used in that way for a prescription; there may be a disparity in the quality of the article which may be used for acidity in beer, or in the stomach; he takes as much as produces the required effect, and if it were important for a man to get the greatest possible amount of effect for the money, it might be to his interest to buy the impure soda and not the pure.

1652. You admit that if a man is prescribed 15 grains of the pure article, he must take a greater amount of the impure?—No doubt of it, and for prescriptions, the pure should be used; it should be used in that state of purity which is indicated.

1653. If the patient has great faith in a chemist in his neighbourhood, he takes the prescription there; but suppose he is not fortunate, and that is a place where the impure soda is sold, still he is told to take a fixed quantity; is not that likely to have a very different effect?—Undoubtedly.

1654. And that is possible to occur, is not it?—Yes; but I do not believe that one-fourth or one-tenth of the drugs which are consumed in this country are used in dispensing prescriptions. A large proportion of the drugs which are used are used by persons who have no prescription; for instance, persons buy rhubarb and jalap, and doctor themselves. The greater part, I should say, of the cheaper medicines which are disposed of are disposed of in that way to persons who buy them and will have cheap drugs, and if they get them cheap, the quality will be as a general rule deteriorated in proportion; they will have to take a little more.

1655. And sometimes those persons get their advice perhaps from the chemist?—They do frequently get a certain amount of advice; that is to say, the chemist who is always dealing in those things knows, or ought to know, what the properties of the drugs he deals in are, and he will speak of the rhubarb as being a purgative of a certain description, and that it should be taken in certain doses.

1656. If he knows it is impure, he prescribes a larger amount of what he sells?—Yes. With reference, however, to such substances as rhubarb, and jalap, and scammony, there are, as I have stated, qualities in those substances of an extrinsic nature, which enhance the price. If, for instance, you take the substance rhubarb; you may have two pieces of rhubarb, each of which would be equally active; but the one would have a higher cost than the other, because it would possess extrinsic qualities. For instance, it would have a compact texture; it would have a certain mottled appearance when cut through, and it would in consequence of possessing those extrinsic qualities, command a much higher price than another piece which would be deficient in them, though it might possess as much activity as the previous one. If you go into some low localities where the poor are supplied with their family medicines, you will find they must have cheap drugs, or they will not have any, and I conceive it would be a great hardship if they were deprived of the opportunity of buying rhubarb or jalap which, being deficient in extrinsic qualities, can be purchased at a lower price.

1657. A small quantity of the pure article is as effective as a large quantity of the impure, is not it?—In reference to the particular article I now speak of it is not so. You may have two specimens of rhubarb, one of which would be much more costly than the other, but the dose would be equal.

1658. *Chairman.*] Would it be a hardship if a man were to buy jalap powder which was largely adulterated with woody fibre?—It would.

1659. If he bought calomel adulterated with chalk?—Undoubtedly.

1660. If he bought grey powder with one-half the prescribed quantity of mercury?—That would be questionable; it may be as active, because nine-tenths of the mercury in grey powder is in a state in which it exerts no action whatever.

1661. If he bought virgin scammony adulterated with resin?—That would be a fraud, but we must have a clear idea of what the substances spoken of are. I hope it is not understood that I am attempting in the slightest degree to

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deny that adulterations exist, or to justify adulterations; but I shall have to explain that in due course, if I have an opportunity, and I may state that there is a very large number of commercial men, and men of high standing and position, who are looking with great anxiety to what goes forth to the public from this Committee. Up to the present time a great deal which has gone forth has tended, as I conceive, and many others competent to judge conceive, greatly to mislead the public.

1662. I have here a specimen of precipitated sulphur adulterated with chalk; would you consider that to be an injurious adulteration?—Milk of sulphur, because that is what the public call it, contains about half its weight of sulphate of lime. One of the processes by which it is made yields that product. It is about half sulphur and half sulphate of lime. What was sold at Apothecaries' Hall, and published in the "Medical Times," was of that description up to the other day.

1663. Would the public, purchasing precipitated sulphur, expect to find it adulterated with chalk?—They would expect to find it adulterated with sulphate of lime.

1664. Mr. *Gregson.*] Is that injurious?—No. To a certain extent the public will not take the other. I have a long explanation to give in reference to some few cases of that description, as to which the public are completely misled.

1665. The public buy what is sold them; they are not judges of the nature of the composition, are they?—It appears to me that it is very important to make a distinction between fraudulent adulteration and conventional adulteration; a case such as has been just referred to is a case according to my notion of conventional adulteration. It is the result of the conventionalities between the manufacturer, the retailer, and the public; the public have been accustomed to have an article of a certain description under a certain name.

1666. Mr. *Moffatt.*] Physicians in prescribing are aware of those conventionalities, are not they, and prescribe accordingly?—In regard to milk of sulphur, for some years an alteration in the mode of making it has been prescribed by the College of Physicians, and what is now by that College designated precipitated sulphur, ought to contain no sulphate of lime; therefore, if you were to go into any of the first establishments, and large chemical houses, and ask for precipitated sulphur, they would give it you without any sulphate of lime; but the public going there will frequently require that which contains sulphate of lime; I have here a specimen (*producing the same*) of milk of sulphur, which is produced by that process which contains sulphate of lime, and a specimen of milk of sulphur which does not contain sulphate of lime; the difference in use is that the one mixes readily with water and the other does not. The public have been accustomed to the one kind, and a large proportion of them still object to receive the other, which is true precipitated sulphur, because it does not possess the properties they are used to.

1667. Mr. *Villiers.*] Does a medical man in prescribing confound the two?—I do not think he does.

1668. Mr. *Gregson.*] If a physician gives me a prescription, and I take it to a druggist's shop, which description shall I get?—I am free to admit that the complete introduction of the purer article, where it is ordered under the name of precipitated sulphur, has not taken place; I think in some localities there are druggists who, if they were asked for precipitated sulphur, would give you that containing sulphate of lime still, even if it were ordered by a prescription, because the knowledge of the change has not yet reached them; the information necessary to bring it about has not reached them.

1669. Would this produce different effects?—The purer description would be the more active of the two; there is nothing injurious in either.

1670. Mr. *Kinnaird.*] In what edition of the Pharmacopœia do you find the regulation as to the precipitated sulphur containing sulphate of lime?—It was not in the Pharmacopœia, it was in a Dispensatory that it was ordered.

1671. Then there is no regular or proper authority for it?—No.

APPENDIX.

PAPERS referred to in the Evidence of *R. Warington*, Esq., 18 July 1855.

No. 1.—February 1844.

[Extracted from "The Memoirs of the Chemical Society," Part 8.]

XCVII. Observations on the Green Teas of Commerce.—By *Robert Warington*, Esq.

In examining lately some samples of tea which had been seized, from their being supposed to be spurious, my attention was arrested by the varied tints which the sample of green tea exhibited, extending from a dull olive to a bright greenish blue colour. On submitting this to the scrutinizing test of examination by the microscope with a magnifying power of one hundred times linear, the object being illuminated by reflected light, the cause of this variation of colour was immediately rendered apparent, for it was found that the curled leaves were entirely covered with a white powder having in places a slightly glistening aspect, and these were interspersed with small granules of a bright blue colour, and others of an orange tint: in the folded and consequently more protected parts of the curled leaves these were more distinctly visible. By shaking the whole of the sample mechanically for a short time, a quantity of powder was detached, and from this a number of the blue particles were picked out under a magnifying glass, by means of the moistened point of a fine camel's hair pencil. On being crushed in water between two plates of glass they presented, when viewed by transmitted light, a bright blue streak. This change in the method of illuminating the object was necessary for the purpose of seeing the action of the following tests:—A minute drop of a solution of caustic potash was introduced by capillary attraction between the glass plates, and the blue tint was immediately converted to a dark bright brown, and the original blue colour again restored by the introduction of a little dilute sulphuric acid. It was therefore evident that these particles consisted of the ferrocyanide of iron, or Prussian blue. The orange granules on examination proved to be some vegetable colouring substance.

To ascertain if possible the nature of the white powder observed on this sample, I separated some of the dust, and heated it to redness with free exposure to the air; the whole of the vegetable matter and Prussian blue was thus destroyed, and a white powder, with a slight shade of brown, was obtained. This dissolved by boiling in dilute hydrochloric acid, and when tested with solution of chloride of barium gave indications of sulphuric acid; it was then evaporated to dryness and again acted upon by very dilute hydrochloric acid; a trace of silica remained undissolved. Solution of ammonia being added threw down a little alumina and oxide of iron, and the ammoniacal solution treated with oxalic acid gave a precipitate of oxalate of lime. A second portion of the powder after calcination was boiled for some time in distilled water, and yielded a solution containing sulphate of lime: this latter substance, therefore, and some other body containing silica, alumina, and perhaps lime, formed the white powder observed. This substance I believe to be kaolin, or powdered agalmatolite, the figure stone of the Chinese. I venture this conjecture not only from the ingredients found, but also from the gloss which the rubbed parts of the curled leaves always assume, and which these materials would be well fitted to produce.

Four or five other samples of green teas were then submitted to the same method of examination, and only one of them proved to be free from these blue granules; this sample was a high-priced tea, and had been purchased about two years; it appeared covered with a very pale blue powder, instead of the white with the blue particles interspersed, as exhibited by the others.

Being still in doubt as to whether this powder and colouring was an adulteration practised in this country or not, I applied to a most extensive wholesale dealer of the highest respectability, and from him obtained a series of samples, each being an average from a number of original chests, and from these I gathered the following results by examination, as before, with the microscope. No. 1. Imperial. The leaf, where seen beneath the superficial coating, was of a bright olive brown colour, with small filaments on its surface; it was covered with a fine white powder and with here and there a minute bright blue particle, at times having the appearance of a stain. No. 2. Gunpowder. Similar to No. 1, but the filaments not visible: this may have arisen from the tight and close manner in which the leaf was curled. No. 3. Hyson. The same as No. 1, the blue particles being perhaps more frequent. No. 4. Young Hyson. The same. No. 5. Twankey. The leaf of this had more of a yellow hue, and was profusely covered with white powder, having the blue particles also more thickly

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strewn over the surface. It was evident from the examination of these teas that they arrive in this country in an adulterated or factitious state.

On detailing what I had thus found to the friend who had favoured me with the preceding samples, he inquired if I had examined any unglazed teas. This appellation immediately arrested my attention, and I requested to inspect some of them, and found that they possessed externally a totally different aspect, indeed, as far as their colour was concerned, not to be like green teas. They were of a yellow-brown tint, without a shade of green or blue, but rather tending on the rubbed parts to a blackish hue. I afterwards received two samples of unglazed teas, specified as of very fine quality, accompanied by two others of the ordinary or, as they are called, in contradistinction, glazed varieties, also of a very superior quality. These were therefore immediately submitted to examination. No. 6. Unglazed gunpowder. It presented the same colour under the microscope as when viewed by the unassisted eye, was filamentous and covered with a white powder inclining to a brown tint, but no shade of blue was visible. No. 7. Unglazed hyson. The same as No. 6. No. 8. Gunpowder glazed. Filamentous, covered with a powder of a very pale blue, and the blue granules being but rarely seen. No. 9. Hyson. The same as No. 8. No. 10. Pidding's howqua, purchased at Littlejohn's at 8*s.* 6*d.* per catty package. This was evidently of the glazed variety; it was filamentous and covered with a pale blue powder, interspersed with bright blue granules. No. 11, intituled Canton gunpowder. This was a splendid sample of the glazed variety, as far as colour was concerned; it was more thickly powdered and blued than any that I have examined, and the dust rose from it in quantity when poured from one paper to another. A great many other samples of ordinary green teas were examined, with much the same results; the cheaper teas, or those in general use, and which form the bulk of the imports, being similar to Nos. 5 and 11, and being represented by twankeys and low-priced hysons or gunpowders.

After several unsuccessful experiments, I found that with a little care, the whole of this powder or facing, if I may be allowed the term, it being entirely superficial, could be easily removed from the tea, by simply agitating the sample briskly for a few seconds in a phial with distilled water, and then throwing the whole on a lawn or muslin filter, in order to strain the liquid, with the suspended matter, from the leaves as rapidly as possible. After this operation, the tea presented a totally altered aspect, as may be supposed; in fact, changing its colour from a bluish green to a bright and lively yellow or brownish yellow tint, and I found that with care, it could be redried at a temperature below 212° without even uncurling the leaf, and without apparent loss of any of its characteristic qualities. When the drying was complete, the sample appeared nearly as dark as the ordinary black teas, and when examined by the microscope, presented a smooth surface, perfectly free from the previously observed facing, and having all the characters of black tea, with the exception of the corrugated aspect which is common to the greater part of the teas of the latter variety, and which evidently arises from their having been exposed in the operation of drying to a much higher temperature. The greenish-coloured turbid liquid which passed through the meshes of the muslin filter was allowed to deposit the matter suspended in it, which was then washed and collected. These sediments, obtained from various samples, were submitted to the following course of chemical examination. They were, in the first instance, tested with a solution of chlorine gas in water, to ascertain if the colouring material was indigo or other vegetable colour; this substance, as we shall presently see, having been supposed by some persons to be the one employed by the Chinese for the purpose of imparting the blue tint to some of their green teas. In no case, however, that I have yet examined have I found this to be the case; but the colouring agent has invariably proved to be the ferrocyanide of iron, or Prussian blue. The presence of this compound was next evidenced by adding a small drop of caustic potash to a little of the sediment under examination, when the green hue was instantly converted to a bright reddish brown, the original blue appearance being again restored by the subsequent addition of a little diluted sulphuric acid. The other ingredients of the facing were sought for in the manner stated in the previous part of this paper, and also by heating a part of the sediment, after calcination and free exposure to the air, with carbonate of soda, to fusion, which, in the case of sulphate of lime being present, formed sulphate of soda and carbonate of lime, and these were each subsequently tested for.

By these means, Nos. 5, 8, 10 and 11, were found to be faced with Prussian blue and sulphate of lime. Nos. 6 and 7 gave no indication of Prussian blue, but of sulphate of lime only. The sulphate of lime from some samples appeared to be crystallized gypsum reduced to a fine powder, the coarser particles still exhibiting a crystalline structure.

Through the kindness of Mr. Greene, of the East India House, I was enabled to obtain samples of the Assam teas in a genuine condition; No. 12. Imperial, No. 13. Gunpowder, and No. 14. Hyson. They had none of the blue granules, were very filamentous, and presented the same appearance as the unglazed varieties, but brighter in colour; the facing was apparently sulphate of lime. No. 15. Assam hyson, of the last importation; it was of the unglazed variety, with the superficial white powder having a slight brown tint, and consisting of a minute quantity of sulphate of lime with a little alumina.

It appears, therefore, from these examinations, that all the green teas that are imported into this country are faced or covered superficially with a powder consisting of either Prussian blue and sulphate of lime or gypsum, as in the majority of samples examined, with occasionally a yellow or orange-coloured vegetable substance; or of sulphate of lime previously stained with Prussian blue, as in Nos. 8 and 9, and one of those first investigated; or of Prussian blue,

blue, the orange-coloured substance with sulphate of lime and a material supposed to be kaolin, as in the original sample; or of sulphate of lime alone, as in the unglazed varieties. It is a curious question what the object for the employment of this facing can be; whether, as when sulphate of lime alone is used, it is simply added as an absorbent of the last portions of moisture which cannot be entirely dissipated in the process of drying, or whether it is only, as I believe, to give that peculiar bloom and colour so characteristic of the varieties of green tea, and which is so generally looked for by the consumer, that the want of the green colour, as in the unglazed variety, I am informed affects the selling price most materially. This surely can only arise from the want of the above facts being generally known, as it would be ridiculous to imagine that a painted and adulterated article, for such it must really be considered, should maintain a preference over a more genuine one. In looking over the various authors who have written on the subject of tea, I have observed the following curious statements bearing on the above subject, and fully confirming many of my results, and with which I shall close the present communication.

In Dr. Horsfield's valuable translation* on the subject of the manufacture of tea in Java, we find, at page 36, the following dialogue:—

"Visitor.—Is it indeed the case that tea is so much adulterated in China?

"Superintendent.—Unquestionably, but not in the interior provinces, for there exist rigid laws against the adulteration of tea; and all teas, as they come out of the plantations, are examined on the part of government, to determine whether they are genuine; but in Canton, which is the emporium of teas, and especially at Honân, many sorts, indeed most teas, are greatly adulterated, and that with ingredients injurious to health, especially if too much of these ingredients be added. This is especially the case with the green tea, in order to improve the colour, and in this manner to add to the value of tea in the eyes of the common consumers.

"Visitor.—Are these ingredients known?

"Superintendent.—Most of them are certainly known; they have been communicated to government (we presume the Dutch government), while at the same time the privilege has been requested that they might not be employed here; and although this occasions loss, the request has been granted, and it has been ordered by government that not the least admixture should take place, either to improve the colour or taste of the tea, even in such cases where this might be desirable."

Dr. Royle states,† "The Chinese in the neighbourhood of Canton are able to prepare a tea which can be coloured and made up to imitate various qualities of green tea; and large quantities are thus yearly made up." And Dr. Dickson,‡ "The Chinese annually dry many millions of pounds of the leaves of different plants to mingle with the genuine, as those of the ash, plum, &c., so that all spurious leaves found in parcels of bad tea must not be supposed to be introduced into them by dealers in this country. While the tea trade was entirely in the hands of the East India Company few of these adulterated teas were shipped for this country, as experienced and competent inspectors were kept at Canton, to prevent the exportation of such in the Company's ships; but since the trade has been opened, all kinds find a ready outlet, and as the demand often exceeds the supply, a manufactured article is furnished to the rival crews."

During these investigations I have received samples of teas, both green and black, imported into this country from China, which are known, by the most experienced brokers, not to contain a single leaf of tea, and which were sold at public sale in bond at from 1¾*d.* to 2*d.* per pound.

Again, "The green tea for exportation undergoes some process which changes its colour, giving it a bluish green hue."

Mr. Davis§ gives the following important information on this subject: "The tea farmers‖, who are small proprietors or cultivators, give the tea a rough preparation, and then take it to the contractors, whose business is to adapt its further preparation to the existing nature of the demand."

"Young hyson¶, until spoiled by the large demand of the Americans, was a delicate, genuine leaf." "As it could not be fairly produced in any large quantities, the call for it on the part of the Americans was answered by cutting up and sifting other green teas through sieves of a certain size; and as the Company's inspectors detected the imposture, it formed no portion of their London importations. But the abuse became still worse of late, for the coarsest black tea leaves have been cut up, and then coloured with a preparation resembling the hue of green teas." At page 466 Mr. Davis continues, after speaking of the frauds with spurious and adulterated teas which the Chinese had endeavoured to practise, "but this was nothing in comparison with the effrontery which the Chinese displayed in carrying on an extensive manufactory of green teas from damaged black leaves, at a village or suburb called Honân."

"The remission of the tea duties in the United States occasioned, in the years 1832 and 1833, a demand for green teas at Canton which could not be supplied by the arrivals from the provinces. The Americans, however, were obliged to sail with cargoes of green teas within the favourable season; they were determined to have these teas, and the Chinese were determined

* Essay on the Cultivation and Manufacture of Tea in Java, translated from the Dutch by Thomas Horsfield, M.D., F.R.S.

† Article Thea in the "Penny Cyclopædia."

‡ Article Thea, Medical and Dietetical, "Penny Cyclopædia."

§ Davis's "Chinese." ‖ Vol. ii, p. 458. ¶ p. 464.

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determined they should be supplied. Certain rumours being afloat concerning the manufacture of green tea from old black leaves, the writer of this became curious to ascertain the truth, and with some difficulty persuaded a Hong merchant to conduct him, accompanied by one of the inspectors, to the place where the operation was carried on." "Entering one of these laboratories of fictitious hyson, the party were witnesses to a strange scene." The damaged black tea leaves, after being dried, were transferred to a cast-iron pan placed over a furnace, and stirred rapidly with the hand, "a small quantity of turmeric, in powder, having been previously introduced; this gave the leaves a yellowish or orange tinge, but they were still to be made green. For this purpose some lumps of a fine blue were produced, together with a substance in powder, which, from the names given to them by the workmen, as well as their appearance, were known at once to be Prussian blue and gypsum. These were triturated finely together with a small pestle, in such proportions as reduced the dark colour of the blue to a light shade; and a quantity equal to a tea-spoonful of the powder being added to the yellowish leaves, these were stirred as before over the fire, until the tea had taken the fine bloom colour of hyson, with very much the same scent. To prevent all possibility of error regarding the substances employed, samples of them were carried away from the place. The Chinese seemed quite conscious of the real character of the occupation in which they were engaged; for, on attempting to enter several other places where the same process was going on, the doors were speedily closed upon the party. Indeed, had it not been for the influence of the Hongist who conducted them, there would have been little chance of their seeing as much as they did."* "It is an interesting and important question to determine whether the same system of artificial colouring enters at all into the manufacture of the more genuine green teas brought to this country." "One fact is well ascertained and undeniable, that the Chinese themselves do not consume those kinds of green teas which are prepared for exportation." † "The young hyson and Pekoe teas, made from the green tea plant, have a yellower and as it were a more natural hue than the bluish-green that distinguishes the elaborated teas imported to us."

Mr. Bruce states,‡ that in the last operation for colouring the green teas "a mixture of sulphate of lime and indigo, very finely pulverised and sifted through fine muslin, in the proportion of three of the former to one of the latter, is added to a pan of tea containing about seven pounds, about half a tea-spoonful of this mixture is put, and rubbed and rolled along with the tea in the pan for about an hour. The above mixture is merely to give it a uniform colour and appearance. The indigo gives it the colour, and the sulphate of lime fixes it. The Chinese call the former *Youngtin*, the latter *Acco*."

Indigo however, as previously stated, has never yet been met with on any of the green teas of commerce that have fallen under my notice.

The following curious observation occurs in Macculloch's 'Commercial Dictionary':— "Blue is a favourite colour with the Chinese; and in 1810–11 the imports of Prussian blue into Canton from England amounted to 253,200 pounds. But for some years past the Chinese have not imported a single pound weight. The cause of the cessation of the trade deserves to be mentioned. A common Chinese sailor, who came to England in an East Indiaman, having frequented a manufactory where the drug was prepared, learned the art of making it, and on his return to China he established a similar work there with such success that the whole empire is now supplied with native Prussian blue."

No. 2.—May 1851.

Observations on the Teas of Commerce.—By *R. Warington*, F.C.S.

In my previous communication to the Society on the subject, in February 1844,§ I endeavoured to show that there exist two distinct kinds of green tea, known in commerce as glazed and unglazed; that the former is coloured by the Chinese with a mixture of Prussian blue and gypsum, to which a yellow vegetable colouring matter is sometimes added, while the latter is merely dusted with a small quantity of gypsum; that in the specimen of the so-called Canton gunpowder, this glazing or facing is carried to the maximum. I also mentioned, that I had never met with a sample of green tea in which the blue tint was given by means of indigo. Since the publication of that paper, I have been in communication with several parties of great experience in this subject, from whom I have received much additional information, which, with several experimental points of interest that have come under my own immediate observations, will form the subject of the present paper.

The first point to which I wish to call the attention of the Society is, the question of the blue colouring matter used by the Chinese for colouring the green teas being Prussian blue, because some doubts have been thrown on this subject from various quarters. Mr. Bruce thus states:‖ "The Chinese call the former (the Indigo) *Youngtin*, the latter (the sulphate of

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* Vol. ii. p. 468. † Vol. ii. p. 469.

‡ Report on the Manufacture of Tea, and on the extent and produce of the Tea Plantations in Assam, by Mr. C. A. Bruce, Superintendent of Tea Culture, presented to the Tea Committee, 16 August 1839.

§ Memoirs and Proceedings of the Chemical Society, II. 73.

‖ Report on the Manufacture of Teas, &c., by C. A. Bruce, 16 August 1839.

of lime) *Acco.*" Now, I am favoured with the opinion of Mr. J. Reeves on this point, whose knowledge and experience render him most competent to decide in such a case; he believes that indigo is never employed for the colouring used on tea; that the term *Youngtin*, as used by Mr. Bruce, should be *Yong-teen*, foreign blue, the name given by the Chinese to Prussian blue in contra-distinction to *Too-teen*, native blue, or indigo; this, I think, is very conclusive evidence, and shows that Mr. Bruce's statement was erroneous.

In another quarter a surmise has also been published on this same point. Mr. Fortune, in his entertaining work* on China, says, speaking of the ingredients used in dying the Northern green teas for the foreign market, p. 201, "There is a vegetable dye, obtained from *Isatis Indigotica*, much used in the northern districts, and called *Tein-ching*, and it is not unlikely that it may be the substance which is employed;" again, at p. 307, "I am very much inclined to believe that this (the *Tein-ching*) is the dye used to colour the green teas which are manufactured in the north of China, for the English and American markets." This question, however, I think, is now satisfactorily settled, and the experimental evidence I had adduced of the material being Prussian blue of a darker or paler tint, placed beyond a doubt by a positive demonstration; for Mr. Fortune has forwarded, from the north of China, for the Industrial Exhibition, specimens of these materials, which, from their appearance, there can be no hesitation in stating are fibrous gypsum (calcined), turmeric root, and Prussian blue; the latter of a bright pale tint, most likely from admixture with alumina or porcelain-clay, which admixture may account for the alumina and silica found as stated in my previous paper, and the presence of which was then attributed possibly to the employment of kaolin or agalmatolite.

Mr. J. R. Reeves, in a letter to my friend, Mr. Thompson, dated 1 July 1844, commenting on my paper, says: "Mr. Warington's experiments have led him to correct results as to the substances used, which I know to be Prussian blue, gypsum (fibrous), and turmeric; the second being sulphate of lime; and the last, the 'yellow, or orange-coloured vegetable substance,' which Mr. W. does not otherwise name. That the colouring is not intended as an adulteration, I feel quite sure. It is given to suit the capricious taste of the foreign buyers, who judge of an article used as a drink by the eye instead of the palate. You well know how little the London dealers, even now, like the yellowish appearance of uncoloured green tea. The Americans, a few years since, carried the dislike even further than the English, and therefore the Chinese merchant had scarcely a chance of selling his tea unless he gave it a 'face' that would suit their fancy. The small quantity of the colouring matter used must preclude the idea of adulteration as a matter of profit." Mr. J. Reeves states, "That in the East India Company's time, gypsum and Prussian blue were sometimes used upon hyson teas, Tien Hing using the first on his pale, bright hyson; Lum Hing, the latter on his dark, bright leaf; but these were only in minute quantities, just sufficient to produce an uniform face."

It is still a question of interest, which I before alluded to, whether the gypsum in its calcined state is not used for the absorption of the last portions of moisture, and allowing the tea the better to withstand the damp of the sea voyage. Through the kindness of Dr. Royle, I have received, since my last communication, a sample of green tea from the Kumaon district, in the Himalayas, which is quite free from any facing, as are also the green teas of Java, a large number of which I have had the opportunity of examining, and which are exceedingly clean and genuine in their appearance and characters.

On Black and Green Teas.

Although the preparation of green and black tea from the respective plants, the *Thea Viridis* and the *Thea Bohea*, has been warmly advocated by many botanists, yet it is now, I believe, pretty generally admitted by all parties, that both green and black teas can be, and are, made indiscriminately from the same parcel of leaves, taken from the same species of plant. It is also well known to all persons, that the infusions from these teas have marked differences of colour and of flavour, and that the effects produced on some constitutions by green tea, such as nervous irritability, sleeplessness, &c., are very distinct from those of black tea. Their characteristic physical differences are too well known to require any comment, but they have peculiar chemical properties to which we shall have occasion to allude more particularly presently, and which have always been attributed by chemists to the effect of high heat in the process of manufacture.

The question presents itself then—from whence do these distinguishing peculiarities arise, and to what are they to be attributed? From observations made in other directions, in the course of the routine work of the establishment to which I am attached, I had formed in my own mind certain conclusions on this subject. I allude to the exsiccation of medicinal herbs; these are for the most part nitrogenous plants, as the *Atropa belladonna*, the *Hyoscyamus niger*, the *Conium maculatum*, and others. The plants are brought to us by the growers or collectors from the country, tied up in bundles, and when they arrive fresh and cool they dry of a good bright green colour; but, on the contrary, it is found that if they are delayed in their transit, or remain in a confined state for too long a period, they become heated, from a species of spontaneous fermentation, and when loosened and spread open emit vapours, and are sensibly warm to the hand; when such plants are dried, the whole of the green colour is found to have been destroyed, and a red brown, and sometimes a blackish-brown

* Three Years' Wanderings in the Northern Provinces of China, by Robt. Fortune.

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brown result is obtained. I had also noticed that a clear infusion of such leaves evaporated carefully to dryness was not all undissolved by water, but left a quantity of brown oxidised extractive matter, to which the denomination *apothem* has been applied by some chemists; a similar result is obtained by the evaporation of an infusion of black tea. The same action takes place by the exposure of the infusions of many vegetable substances to the oxidising influence of the atmosphere; they become darkened on the surface, and this gradually spreads through the solution, and on evaporation the same oxidised extractive matter will remain insoluble in water. Again, I had found that the green teas, when wetted and re-dried, with exposure to the air, were nearly as dark in colour as the ordinary black teas. From these observations, therefore, I was induced to believe that the peculiar characters and chemical differences which distinguish black tea from green, were to be attributed to a species of heating or fermentation, accompanied with oxidation by exposure to the air, and not to its being submitted to a higher temperature in the process of drying, as had been generally concluded. My opinion was partly confirmed by ascertaining from parties conversant with the Chinese manufacture, that the leaves for the black teas were always allowed to remain exposed to the air in mass for some time before they were roasted. Mr. Ball, in his valuable work * on the manufacture of tea, has described in detail the whole routine of these interesting processes, fully confirming my preconceived opinions, and of which I cannot do better than give you a summary. Some of the facts, I believe, had been published in Batavia in 1844, by Mr. Jacobson,† in the Dutch language. In the preface to his work, Mr. Ball says: "It will be seen by dates incidentally adverted to, that the facts and most of the materials of this work were established and collected 30 years ago."—"These facts, as well as other materials, were derived from conversation with growers and manipulators from the tea districts; from written documents furnished by Chinese; from published works in the same language diligently sought out; and also from correspondence with a Spanish missionary long resident in the province of Fokien. These were all put into their present form full 20 years ago, and were read to one or two friends during my residence in China."—"They were not, however, so arranged with any view to immediate publication."—"They were thus disposed as the best mode of recording and keeping together the facts and materials I had collected."—"But it was not till the year 1844, when I received Mr. Jacobson's Handbook on the cultivation of tea in Java, that I found my own views so far confirmed, and my information such as to justify me in bringing my labours to a close."

The processes peculiar to the preparation of black tea, are styled Leang-Ching, To-Ching, and Oc-Ching, and these all consist in carefully watched and regulated processes of spontaneous heating or slow fermentation of the leaves until a certain degree of fragrance is developed. The leaves are said to wither and give, and become soft and flaccid. The utmost care, practical skill, and experience is required in the properly conducting these operations, and as soon as the proper point is arrived at, the leaves are to be immediately removed to the kuo or roasting-pan. After being roasted and rolled two or three times, they are then to be dried, and this is effected in the poey-long, which consists of a cylinder of basket-work, open at both ends, and covered on the outside with paper; it is about 2½ feet in height and 1½ in diameter, which diameter is diminished in the centre like an ordinary dice-box to one foot and a quarter. This stands over and round a small charcoal fire, and is supplied with cross-bars about 14 inches above the fire, on which an open sieve containing the tea is placed; and a small aperture, about an inch and a half in diameter, is made in the centre of the tea with the hand, so that an ascending current of air and the products of the combustion pass through and over the tea contained in the sieve. A circular, flat bamboo tray is placed partially over the mouth of this cylinder, and most probably serves to regulate the rapidity of the ascending current, prevent the admission of the cold air to the leaves, and at the same time allow a sufficient outlet for the generated watery vapours and the products of combustion. At the commencement of this operation, the moist leaves are still green, and retain their vegetable appearance; after the drying has continued about half an hour, the leaves are turned, and again submitted to the heat for another half-hour; they are then taken out, rubbed and twisted, and after sifting away the small dust, again returned to the sieve and drying tube. This operation of sifting is very necessary, to remove any of the small tea or dust which might otherwise fall through the meshes of the sieve on to the fire, as the products of their combustion would deteriorate and spoil the flavour of the tea. The leaves have now begun to assume their black colour, the fire is diminished or deadened by ashes, and the operation of rolling, twisting and sifting is repeated once or twice until they have become quite black in colour, well twisted, and perfectly dry and crisp. They are then picked, winnowed, and placed in large quantities over a very slow fire for about two hours, the cylinder being closed.

Now, that this black colour is not owing to the fire is evident; for in cases mentioned by Mr. Ball, where the leaves have been dried in the sun, the same colour is obtained; and on the other side, if roasted first, without the process of fermentation or withering, and then finished in the poey-long, a kind of green tea is produced.

In the operations for the manufacture of green tea, on the contrary, the freshly-picked leaves are roasted in the kuo at once, without delay, at a high temperature; rolled and roasted again and again, assisted sometimes with a fanning operation to drive off the moisture; and always with brisk agitation until the drying is completed.

The

* An Account of the Cultivation and Manufacture of Tea in China, by Samuel Ball, Esq.
† Handboek v. d. Kult. en Fabrik v. Thee.

The marked differences in the mode of manufacture of black and green tea, will, I consider, after what has been stated, fully account for all the variation of physical and chemical properties to which I have before alluded.

Adulteration and Sophistication of Teas.

Since writing my former paper, several teas have come under my notice, which must be classed under this head. The first I shall mention is a sophistication which has been carried on in this country to some extent, and consists in giving the appearance of green tea to an imported black tea. The material used as the basis for this process of manufacture is a tea called scented caper; it is a small, closely-rolled black tea, about the size of small gunpowder, and when coloured, is vended under this latter denomination, the difference in price between the scented caper and this fictitious gunpowder being about 1*s.* per lb., a margin sufficient to induce the fraud. This manufacture has been carried on, I understand, at Manchester, and was kept as secret as possible; and it was only after considerable trouble that some of my friends succeeded in obtaining two different specimens for me, that could be fully depended on, as originating in this manufactory. It appears that it is generally mixed with other tea, so as to deceive the parties testing it. How this manufacture was conducted, I am not prepared to say; but some preparation of copper must have been employed, as the presence of that metal is readily detected in the specimens I received. I believe, however, that this sophistication has ceased.

I have now to call your attention to another adulteration of the most flagrant kind. Two samples of tea, a black and a green, were lately put into my hands by a merchant for examination, the results of which he has allowed me to make public. The black tea was styled scented caper; the green, gunpowder; and I understand they are usually imported into this country in small chests, called catty packages. The appearance of these teas is remarkable; they are apparently exceedingly closely rolled, and very heavy; the reasons for which will be clearly demonstrated. They possess a very fragrant odour. The black tea is in compact granules, like shot of varying size, and presenting a fine glossy lustre of a very black hue. The green is also granular and compact, and presents a bright pale-bluish aspect, with a shade of green, and so highly glazed and faced, that the facing rises in clouds of dust when it is agitated or poured from one vessel to another; it even coats the vessels or paper on which it may be poured. On examining these samples, in the manner described in my former paper, to remove this facing, I was struck by the tenacity with which it adhered to the surface, and which I had never remarked in any previous sample, requiring to be soaked for some time in the water before it could be detached; with this precaution, however, the greater part of the facing material was removed. It proved, in the case of the sample of green tea, to be a pale Prussian blue, a yellow vegetable colour, which we now know to be turmeric, and a very large proportion of sulphate of lime. The facing from the sample of black tea was perfectly black in colour, and on examination was found to consist of earthy graphite, or black lead. It was observed, that during the prolonged soaking operation, to which these teas had been submitted, there was no tendency exhibited in either case to unroll or expand, for a reason which will be presently obvious. One of the samples was therefore treated with hot water, without however any portion of a leaf being rendered apparent. It increased in size slightly, was disintegrated, and then it was found that a large quantity of sand and dirt had subsided; this was separated by decantation, and collected; it was found to amount to 1·5 grains from 10 grains of the sample, or 15 in the 100 parts. It was evident, however, that much of the lighter particles must necessarily have been lost in the process of decantation; a weighed quantity of the sample was therefore carefully calcined, until the ash was quite white, and the whole of the carbonaceous matter burnt off, it yielded a result equivalent to 37·5 on the 100 parts. During this operation also, no expansion or uncurling of the leaf, as is generally to be observed when heat is applied to a genuine tea, was seen; in fact, it was quite evident that there was no leaf to uncurl, the whole of the tea being in the form of dust. The question next presented itself as to how these materials had been held together, and this was readily solved; for, on examining the infusion resulting from the original soaking of the sample, abundant evidence of gum was exhibited.

The sample of green tea was of a precisely similar kind to the black; it yielded 4·55 grains of ash, &c. from 10 grains of the specimen, or 45·5 per cent. A specimen of Java gunpowder yielded 5 per cent. of ash; so that we have in this sample 40·5 per cent. of dirt and sand over and above the weight of ash yielded by the incineration of a genuine tea.

Thus we have then in these samples a mixture of tea-dust with dirt and sand, agglutinated into a mass with a gummy matter, most probably manufactured from rice-flour, then formed into granules of the desired size, and lastly dried and coloured, according to the kind required by the manufacturer, either with black lead, if for black tea; or with Prussian blue, gypsum, or turmeric, if intended for green.

Since examining these two samples, I have obtained through a friend another specimen of green tea, having a very different appearance; that is, better manufactured, or rather, I should say, more likely to deceive the consumer, from its being made to imitate an unglazed tea. It is of a yellowish-green colour, scented and granulated as the former samples, and not much dusted; it yielded 34 per cent. of ash, sand and dirt.

On inquiry, I have learnt that about 750,000 lbs. weight of these teas have been imported into this country within the last eighteen months, their introduction being quite of modern origin; and I understand that attempts have been made to get them passed through the Customs as manufactured goods, and not as teas; a title which they certainly richly merit,

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although it must be evident, from a moment's consideration, that the revenue would doubtless be defrauded, inasmuch as the consumer would have to buy them as teas from the dealer. It is to be feared, however, that a market for them is found elsewhere. The Chinese, it appears, will not sell them except as teas, and have the candour to specify them as *lie* teas; and if they are mixed with other teas of low quality, the Chinese merchant gives a certificate, stating the proportion of the lie tea present with the genuine leaf. This manufacture and mixing is evidently practised to meet the price of the English merchant. In the case of the above samples, the black is called by the Chinese, lie flower caper; the green, lie gunpowder; the average value is from 8 *d.* to 1 *s.* per lb. The brokers have adopted the curious term gum and dust, as applied to these lie teas or their mixtures, a cognomen which at first I had some difficulty in understanding, from the rapid manner in which the two first words were run together.

I may subjoin the results obtained from the careful incineration of a variety of teas, as they may be interesting, for the purpose of comparison, and illustrate the point I have mentioned as to these spurious teas being mixed with genuine ones.

Gunpowder tea, made in Java, gave 5·0 grains of ash in the 100 parts:

Gunpowder, during the East India Company's Charter	5·0
Kumaon hyson	6·5
Assam hyson	6·0
Lie gunpowder, No. 1	45·5
„ No. 2	34·0
Scented caper	5·5
Lie flower caper	37·5
Mixtures containing these lie teas, No. 1	22·5
„ „ No. 2	11·0

No. 3.—May 1852.

Chemical Memoranda.—By *Robert Warrington.*

In laying the present short notices before the Chemical Society, I do it with the impression that the example may be useful as a means of registering a great number of very interesting and sometimes important facts and observations, which, taken in their isolated state, would not afford sufficient matter for their being arranged in the form of a paper, and therefore are generally laid aside, and frequently altogether lost to science; whereas, if they were collected and arranged as a series of memoranda, they would serve to occupy profitably a few pages of our transactions, with useful practical observations, and give rise at the meetings of the society to much valuable discussion. Under this impression, therefore, I have made bold to endeavour to pioneer the way, in a path which I hope to see followed by many of our working members.

The first Memorandum I shall submit to your attention is:—

On a curious form of Crystallization of Iodide of Potassium.

In the preparation of this salt on the large scale, crystals are at times obtained presenting a very curious appearance, namely, that of a cubic needle or prism, of considerable length, and of varying diameter, and apparently formed by the superposition of cube upon cube. The specimens to which I would more particularly direct your attention, were procured some years since, and have become much injured and fractured; but sufficient of them remains to demonstrate fully the following details of measurement. Two only of these crystals were selected for this purpose; but I may mention that many similar ones were obtained at the same time as these. The first specimen had a total length of 4·40 inches, which was composed of the following divisions:

At its point of attachment to the general mass of salt, its diameter was:

$\frac{6}{40}$ of an inch, which continued for $\frac{12}{40}$ of an inch; it then
decreased to $\frac{5}{40}$ „ „ „ $\frac{85}{40}$ „ „
„ „ $\frac{3}{40}$ „ „ „ $\frac{33}{40}$ „ „
„ „ $\frac{1}{40}$ „ „ „ $\frac{16}{40}$ „
where the crystal terminated.

$\frac{176}{40}$=4·40 inches.

The second specimen was found to give the following measurements: Its entire length was 2 $\frac{1}{40}$ of an inch, and the diameter of the cubic needle, at its junction with the rest of the crop, was:

$\frac{7}{40}$ of an inch, which continued for $\frac{14}{40}$ of an inch; it then
decreased to $\frac{5}{40}$ „ „ „ $\frac{\text{?}5}{40}$ „ „
„ „ $\frac{4}{40}$ „ „ „ $\frac{48}{40}$ „

Total length $\frac{87}{40}$=2 $\frac{7}{40}$ inches.

It

It will be evident, therefore, that these crystals exhibit certain distinct and strongly marked intervals of decrease in their stages of progression; and this decrease in the diameter of the cube is sudden and abrupt, forming at that point sharp and well-defined angles, and not passing gradually from one dimension into the other as it elongates. It will be noticed, also, in looking over the measurements, that a perfectly symmetrical cubic arrangement is maintained throughout their whole extent, and that the intervals of length correspond exactly to a multiple of the diameters of the cubes.

These crystals are most frequently obtained when the solutions from which they are deposited are rather alkaline.

Memorandum II.

On a Method of detecting, qualitatively, small quantities of Oxide of Copper in Solution.

This operation depends upon the solubility of the ferrocyanide of copper in an excess of a solution of ammonia, and its deposition with its well-marked characteristic appearances as the ammonia evaporates. Thus, supposing a frequently occuring case, where the oxide of copper, in very small quantity, is in solution with oxide of iron, and that these metals have been brought to their highest state of oxidation; ammonia is next added in excess, and then a few drops of a solution of the ferrocyanide of potassium, and the whole thrown upon a filter. As the ammonia escapes from the filtrate by standing, and free exposure to the air, the red ferrocyanide of copper will be deposited, and if the experiment be made in a shallow white porcelain dish, the result will be very distinct and characteristic, and on carefully decanting the fluid, will be found on the white surface. In many cases, the process of filtration may be dispensed with altogether, as the suspended peroxide of iron does not in the least interfere with the deposition of the ferrocyanide of copper from the solution. I have found this test give unerring indications in cases where no trace of blue colour could be distinguished in the ammoniacal solution, and where no precipitation could be procured by hydrosulphuric acid gas or the action of a voltaic circuit.

When organic colouring matter is present, this form of test is also very useful, as in vinegars, &c., and it was in a case of this kind which came under my notice some years since that I was induced to put it more fully into practice. A party was seeking to recover compensation for the destruction of some valuable meadow lands, from the action, it was affirmed, of the waste waters from some copper mines. These meadows owed their luxuriance, and consequent value, to a periodic inundation by the water from the granite moors of that part of Cornwall. Several copper mines had, however, been opened on these high lands; and from the scarcity of water, it was retained at the mines for some time, being used over and over again for stamping and dressing the ores, until it became, as a natural consequence, highly charged with metallic impurities. In this state it was, at certain intervals of time, discharged in large quantities down the valley, overflowing the banks of the stream, and causing the destruction complained of.

The great object, in a chemical point of view, was to trace the cause of the injury into the substance of the injured herbage, the dead grass; and this I found could be readily and satisfactorily accomplished by means of the test now indicated.

Our late respected President, Mr. Phillips, to whom I mentioned this mode of testing some years since, introduced it into his translation of the London Pharmacopœia.

Memorandum III.

Some additional Observations on the Green Teas of Commerce.

Since the publication of my last communication on this subject, read before the Society on May 19, 1851, a series of microscopical and chemical examinations have been published* which have induced me to institute some additional experiments, the results of which may not be without interest to some of the members of the Society, particularly as they tend to remove a curious anomaly that has lately arisen. In the series of examinations alluded to, it is stated that several of the specimens of green tea submitted to investigation, were coloured with indigo mixed with porcelain clay; and this is followed by an examination of some of the colouring materials themselves used at Canton for this purpose, and which had been obtained from the museum at Kew Gardens. As I had stated† that, up to that period, no sample in which indigo had been employed as an artificial colouring agent for green teas had come under my notice, I felt it incumbent on me to investigate the matter. For this purpose I applied to Sir W. Hooker on the subject, and he allowed me in the handsomest manner to take from the cases in the museum, small portions of the materials for examination, and also favoured me with the loan of the manuscript journal of Mr. Berthold Seeman, by whom the specimens had been collected while at Canton, as Naturalist of Her Majesty's ship "Herald," then on a survey in that quarter of the globe. As these documents have been since published,

* The Lancet, 9 August 1851.

† Qu. J. Chem. Soc. IV. p. 156.

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lished, and as the subject opens some interesting particulars, I have taken the liberty of appending his account in his own words.* Mr. Seeman here distinctly states, that around Canton the green tea is dyed with Prussian blue, turmeric, and gypsum; that, in the manufacture he inspected, the dyes above mentioned were added; and he gives their proportions. That there was no concealment or mysterious proceeding; that one of the great merchants conducted him over his own, and also another manufactory, and that everything was conducted openly and exhibited with great civility. And yet, strange to say, Mr. Seeman appears to have been deceived notwithstanding all this; for on submitting these materials to the action of chemical tests, there could be no doubt that they consisted of indigo, of a very inferior quality, and leaving a very large proportion of inorganic matter by calcination, and of porcelain clay. It is also curious that the very case selected by Mr. Seeman to illustrate the processes, is the conversion, by means of this facing or glaze, of a low quality of black tea (Bohea Saushung) valued at about 4*d.* to 6*d.* the pound, into high quality green teas, valued at from 1*s.* to 1*s.* 6*d.* the pound; but although Mr. Seeman does not allow this to be an adulteration, yet surely he cannot deny that it is a fraud.

Another very good method which I have lately employed of removing the colouring matter from the surface of green teas, for the purpose of microscopical investigation, and one attended with very little trouble, is to take a piece of cream-coloured wove paper, or paper free from blue colouring material, and having breathed on its surface, or rendered it slightly damp, to pour the sample of tea under examination, from the containing paper or vessel upon it. On then removing it back again, a quantity of the facing powder will be found adhering to the surface of the paper; and on placing it under the microscope, it will be found studded with the colouring materials used, and the blue particles can be subjected to the action of chemical tests with the greatest ease, by placing a minute drop of the re-agent on the granules with the end of a small stirring rod, or slip of glass, and noting the effect.

Memorandum IV.

A Modification of the ordinary process of Sublimation in a Straight Tube.

In examining the blue colouring material used for green tea taken from the Kew Museum, so as to demonstrate its being indigo, I was led to try a modified arrangement in the ordinary method of using the straight tube for sublimation. It consists simply in introducing the material to be examined into a small capillary tube, of such an external dimension, that it can be easily passed into the interior of another tube, which should be of hard white glass. By this means, the substance can be placed over whatever part of the external tube the operator may desire, at the same time avoiding any risk of soiling the part of the external tube on which the sublimate is to be condensed, and with the power of withdrawing the material at any time for the removal of condensed moisture, or only matter, as also of shifting its position during the operation. The experiment being completed, the internal tube is withdrawn, and both the fixed residue and the volatile constituents can be readily submitted to chemical agents, or put by for future investigation.

I have since employed this arrangement in various other cases, as in the detection of arsenic and corrosive sublimate in cases of poisoning, with complete success.

* Hooker's Journal of Botany and Kew Garden Miscellany, No. 37, for January 1852: "In the 'Manual of Scientific Inquiry' you ask whether, in the northern provinces of China, indigo or any other vegetable dye is used in colouring green tea? Whether different processes of dyeing are pursued in the north from those of the south, I cannot say, but it is certain that around Canton, whence great quantities are annually exported, the green tea is dyed with Prussian blue, turmeric and gypsum, all reduced into fine powder. The process is well described by Sir J. F. Davis ('the Chinese,' III., 244), who, however, falls into the strange mistake of supposing the whole proceeding of colouring to be an adulteration, and leaves his readers to infer that it is only occasionally done in order to meet the emergency of the demand; while it is now very well known that all the green tea of Canton has assumed that colour by artificial dyeing. I had heard so much about tea, copper-plates, picking of the leaves, rolling them up with the fingers, boiling them in hot water, &c., that I became anxious to see with my own eyes the process of manufacture, of which the various books had given me such a confused idea. One of the great merchants conducted me not only to his own, but also to another establishment, where the preparation of the different sorts was going forward. There was no concealment or mysterious proceeding, everything was conducted openly, and exhibited with the greatest civility; indeed, from all I saw in the country, I am almost inclined to conclude that either the Chinese have greatly altered, or their wish to conceal and mystify everything, of which so much has been said, never existed.

"The tea is brought to Canton unprepared. After its arrival it is first subjected to cleaning. Women and children are employed to pick out the pieces of twigs, seeds, and other impurities with which it happens to be intermixed. The only sorts which may be called natural, are those gathered at different seasons; the rest are prepared by artificial means.

"Without entering into a description of all these processes, it may suffice to take one as an example. A quantity of Bohea Saushung was thrown into a spherical iron pan kept hot by means of a fire beneath. These leaves were constantly stirred about until they became thoroughly heated, when the dyes above mentioned were added, viz., to about twenty pounds of tea, one spoonful of gypsum, one of turmeric, and two or even three of Prussian blue. The leaves instantly changed into a bluish green, and, having been stirred for a few minutes, were taken out. They, of course, had shrivelled, and assumed different shapes from the heat. The different kinds were produced by sifting. The small longish leaves fell through the first sieve, and formed young hyson, while those which had a roundish, granular shape, fell through last, and constituted choo-cha, or gunpowder."

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SECOND REPORT

FROM THE

SELECT COMMITTEE

ON

ADULTERATION OF FOOD, &c.;

TOGETHER WITH THE

PROCEEDINGS OF THE COMMITTEE

AND

MINUTES OF EVIDENCE.

Ordered, by The House of Commons, *to be Printed,*
8 *August* 1855.

Martis, 26° *die Junii*, 1855.

Ordered, THAT a Select Committee be appointed on Adulteration of Food, Drinks, and Drugs.

Jovis, 5° *die Julii*, 1855.

Committee nominated of,—

Mr. Scholefield.	Mr. Alderman Cubitt.
Mr. Charles Villiers.	Mr. Kinnaird.
Lord Claud Hamilton.	Mr. Otway.
Viscount Goderich.	Mr. Swift.
Mr. Knight.	Mr. Gregson.
Mr. Sheridan.	Mr. Wise.
Mr. Peacocke.	Mr. Moffatt.
Viscount Ebrington.	

Ordered, THAT the Committee have power to send for Persons, Papers, and Records.

Ordered, THAT Five be the Quorum of the Committee.

Veneris, 27° *die Julii*, 1855.

Ordered, THAT the Committee have power to Report the Minutes of Evidence taken before them to The House.

Mercurii, 8° *die Augusti*, 1855.

Ordered, THAT the Committee have power to Report their Observations to The House.

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SECOND REPORT.

THE SELECT COMMITTEE appointed to Inquire into the ADULTERATION of FOOD, DRINKS, and DRUGS, and who were empowered to report their Observations to The HOUSE;——HAVE made further progress in the Matters to them referred, and have agreed to the following SECOND REPORT:—

THAT they have taken Evidence on the subject referred to them, but have found themselves unable to complete the inquiry within the time at their disposal.

They confine themselves, therefore, to reporting to The House the Evidence already brought before them, with a recommendation that the investigation be renewed in the ensuing Session of Parliament.

8 *August* 1855.

PROCEEDINGS OF THE COMMITTEE.

Jovis, 10° *die Julii*, 1855.

MEMBERS PRESENT:

Mr. Alderman Cubitt.
Mr. Otway.
Mr. Wise.
Mr. Charles Villiers.
Mr. Peacocke.
Mr. Gregson.
Mr. Kinnaird.
Mr. Scholefield.
Mr. Sheridan.

Mr. SCHOLEFIELD is called to the Chair.

Committee considered course of proceedings.

[Adjourned till Friday, at One o'clock.

Veneris, 13° *die Julii*, 1855.

MEMBERS PRESENT:

Mr. SCHOLEFIELD in the Chair.

Mr. Charles Villiers.
Mr. Moffatt.
Lord Claud Hamilton.
Mr. Sheridan.
Mr. Otway.
Mr. Peacocke.
Viscount Ebrington.
Mr. Gregson.
Mr. Swift.
Mr. Knight.
Mr. Kinnaird.
Mr. Wise.
Viscount Goderich.

Mr. *Arthur Hill Hassell*, M. D., examined.

[Adjourned till Wednesday, at half-past Twelve o'clock.

Mercurii, 18° *die Julii*, 1855.

MEMBERS PRESENT:

Mr. SCHOLEFIELD in the Chair.

Mr. Peacocke.
Lord Claud Hamilton.
Mr. Kinnaird.
Viscount Goderich.
Mr. Swift.
Mr. Sheridan.
Mr. Wise.
Mr. Knight.
Mr. Otway.
Mr. Charles Villiers.
Mr. Gregson.

Mr. *Arthur Hill Hassell*, M. D., further examined.

Mr. *Robert Warrington* and Mr. *Alphonse Normandy*, M. D., examined.

[Adjourned till Friday next, at half-past Twelve o'clock.

Veneris, 20° *die Julii*, 1855.

MEMBERS PRESENT:

Mr. SCHOLEFIELD in the Chair.

Viscount Goderich.	Mr. Charles Villiers.
Mr. Wise.	Lord Claud Hamilton.
Viscount Ebrington.	Mr. Kinnaird.

The Committee further examined Mr. *Alphonse Normandy*, M.D.

[Adjourned till Wednesday next, at half-past Twelve o'clock.

Mercurii, 25° *die Julii*, 1855.

MEMBERS PRESENT:

Mr. SCHOLEFIELD in the Chair.

Viscount Goderich.	Mr. Charles Villiers.
Mr. Wise.	Mr. Gregson.
Mr. Peacocke.	Mr. Knight.
Mr. Moffatt.	Viscount Ebrington.
Mr. Swift.	Mr. Kinnaird.
Mr. Sheridan.	

The Committee examined Mr. *John Simon*, Sir *John Gordon*, Mr. *Mitchell*, and Mr. *Robert D. Thomson*, M.D.

[Adjourned till Friday next, at half-past Twelve o'clock.

Veneris, 27° *die Julii*, 1855.

MEMBERS PRESENT:

Mr. SCHOLEFIELD in the Chair.

Viscount Ebrington.	Mr. Charles Villiers.
Mr. Knight.	Mr. Sheridan.
Mr. Otway.	Mr. Gregson.
Mr. Wise.	Mr. Kinnaird.
Mr. Moffatt.	

Mr. *Robert Thomson*, M.D., further examined.

Mr. *Thomas Blackwell*, and Mr. *Theophilus Redwood*, PH.D., examined.

The Committee agreed to report Minutes of Evidence.

[Adjourned till Tuesday, at half-past Twelve o'clock.

Martis, 31° *die Julii*, 1855.

MEMBERS PRESENT:

Mr. SCHOLEFIELD in the Chair.

Viscount Goderich.	Mr. Kinnaird.
Mr. Charles Villiers.	Mr. Moffatt.
Mr. Swift.	Mr. Gregson.
Mr. Otway.	Viscount Ebrington.
Mr. Wise.	

The Committee further examined Mr. *Theophilus Redwood*, PH. D., and Mr. *Alphonse Normandy*, M. D.

[Adjourned till To-morrow, at half-past Twelve o'clock.

Mercurii, 1° *die Augusti*, 1855.

MEMBERS PRESENT:

Mr. SCHOLEFIELD in the Chair.

Mr. Charles Villiers.	Mr. Kinnaird.
Viscount Goderich.	Viscount Ebrington.
Mr. Wise.	Mr. Otway.
Mr. Gregson.	

The Committee examined Mr. *Thomas Herring*, Mr. *Peter L. Simmonds*, and Mr. *John Postgate*.

[Adjourned till Friday, at half-past Twelve.

Veneris, 3° *die Augusti*, 1855.

MEMBERS PRESENT:

Mr. SCHOLEFIELD in the Chair.

Mr. Otway.	Mr. Charles Villiers.
Mr. Moffatt.	Mr. Gregson.
Viscount Goderich.	Mr. Kinnaird.

The Committee examined Mr. *Charles Burton* and Mr. *George Phillips*.

Mr. *Alphonse Normandy*, M.D., further examined.

[Adjourned till Wednesday, at Twelve o'clock.

Mercurii, 8° *die Augusti*, 1855.

MEMBERS PRESENT:

Mr. SCHOLEFIELD in the Chair.

Mr. Kinnaird.	Mr. Charles Villiers.
Mr. Alderman Cubitt.	Mr. Gregson.
Viscount Goderich.	Viscount Ebrington.
Mr. Otway.	

Mr. *Richard Archer Wallington* examined.

Mr. *John Postgate* further examined.

Mr. *Henry Letheby*, M. D., and Mr. *Maurice Scanlan* examined.

Draft

Draft Report read, as follows: " Your Committee beg to report that they have taken Evidence on the subject referred to them, but have found themselves unable to complete the inquiry within the time at their disposal. They confine themselves, therefore, to reporting to The House the Evidence already brought before them, with a recommendation that the investigation be renewed in the ensuing Session of Parliament."

Question, " That this be the Report of the Committee," put, and agreed to.

Ordered to Report, together with the Minutes of Evidence.

LIST OF WITNESSES.

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Martis, 31° *die Julii*, 1855.

MEMBERS PRESENT.

Mr. Scholefield.	Mr. Moffatt.
Mr. Villiers.	Viscount Goderich.
Mr. Swift.	Mr. Otway.
Mr. Gregson.	Viscount Ebrington.
Mr. Kinnaird.	Mr. Wise.

WILLIAM SCHOLEFIELD, Esq., IN THE CHAIR.

Theophilus Redwood, Esq., PH.D., called in; and further Examined.

T. Redwood, Esq., PH. D.

31 July 1855.

1672. *Chairman.*] PERHAPS you will resume your evidence at the point at which you left off on the last occasion?—I was anxious at the last meeting of the Committee to draw a distinction between impurities and adulterations, and I referred on that occasion to some chemical products which are very largely produced and used in this country, and pointed out that in the production of those articles processes are frequently, nay, generally adopted, which have for their object to produce them in a sufficient state of purity for the purposes for which they are intended, at the lowest price at which they can be manufactured. I instanced carbonate of soda, carbonate of potash, nitrate of potash, cyanide of potassium, and Epsom salts. Perhaps I may be allowed, before I proceed, to explain the distinction between carbonate of soda, which I mentioned at the last meeting of the Committee, and the substance which I have since had reason to believe some Members of the Committee had in their minds, namely, bi-carbonate of soda. Chemists distinguish the two substances by those names, carbonate of soda and bi-carbonate of soda; carbonate of soda is largely used in manufacturing operations, but little used in medicines. It was that to which I was referring. The bi-carbonate of soda is very frequently called carbonate of soda in common language, but it is distinguished by chemists as bi-carbonate; it is that which is principally used in medicine. I wish to resume the subject this morning by referring to the kind of carbonate of soda which is principally used in medicine, which we call bi-carbonate of soda, or sometimes sesquicarbonate of soda; it is a white powder, used as an antacid.

1673. Mr. *Villiers.*] And sold by chemists and druggists?—Yes; that substance was mentioned by a previous witness as one of the substances which are subject to adulteration; and it was included in a list in which also were mentioned bi-carbonate of potash, calomel, mercury, iodine, and magnesia. It will be recollected that as regards the chemical products to which I referred at the last meeting of the Committee, I admitted that they are frequently in a state far from pure, but sufficiently pure for the purposes for which they are intended. With reference to the substances now under notice, I consider that in the state in which they are commonly met with in commerce they are in such a condition as to purity that no exception can be taken to them; and I speak of that as the general rule to which there are few exceptions. The exceptions are so rare that I doubt if they would constitute one per cent. of the whole number of cases. I will first of all take carbonate of soda, popularly so called, the bi-carbonate of soda of the chemist. This is kept in every chemist's shop.

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1674. Sold by him as carbonate of soda?—Yes, generally speaking, marked as carbonate. According to my experience, as met with in commerce this substance is in a great state of purity. As met with in commerce it is never adulterated; I have never met with an instance, and I never heard of an instance in which it was adulterated.

1675. Will you explain what you mean by the expression "met with in commerce"?—I speak of the state in which it is sold by dealers. I do not now refer to specimens which are kept in museums, but to what you ordinarily meet with in shops. If you were to begin at Hyde Park Corner and go to the end of Whitechapel, and get a specimen from every shop on your way, in 99 cases out of 100 the article would be so nearly pure that no chemist could take exception to it. I beg to state in confirmation of that, that since the last meeting of the Committee I have taken the pains to collect specimens of that article from different parts of London, sending especially to all the low neighbourhoods about Whitechapel, Blackfriars-road, Camden Town, Saint Giles, Seven Dials; all the low neighbourhoods of London. I have obtained 40 samples of carbonate of soda, and in no one of them was there any appreciable amount even of impurity.

1676. Did you send in your own name?—I did not, nor was it stated in any one instance for what purpose it was required; I must at the same time in fairness admit, that since the last meeting Dr. Normandy brought me a sample of bi-carbonate of soda, and requested me to analyse it. I did so, and found it contained 12 per cent. of sulphate of soda. He asked me if I thought that was an adulteration. I said I did not consider that it was an adulteration, but it was an amount of impurity which rendered it unfit for use in medicine; that it ought not to be used in medicine; that there was nothing in it injurious, but to the extent to which sulphate of soda was present, carbonate of soda was absent. He explained to me the circumstances under which he got it. He said he went to a neighbour of his in Judd-street, and purchased some carbonate of soda, which, on taking home, he found to be pure. He asked the druggist if he could refer him to any place where he was likely to get what was impure, and he was directed to some little street running out of the New-road, near Battle Bridge, and there he purchased some. That was impure to the extent to which I have stated. But I sent into the same neighbourhood, though I do not know that I sent to the same shop, and no one of the 40 specimens procured by me from that and other neighbourhoods contained any appreciable amount of impurity. They were some of them a little deficient in the proportion of carbonic acid they should contain; that is to say, they were not quite brought up to what chemists would call the bi-carbonate, containing two equivalents of carbonic acid to one of soda; but I ascribe that defect to the circumstance of their having been generally kept in packages in paper, as from exposure to the air bi-carbonate of soda would lose part of its carbonic acid. But carbonate of soda, popularly so called, the bi-carbonate of chemists, as sold in this country is irreproachable; it is made by large makers such as Muspratt, and other makers of that description, and it is sold at such a price that there is no object in this adulteration.

1677. Did you pay a high price for these 40 specimens?—No, I did not; the price varied from 1 *d.* an ounce to 2 *d.* an ounce.

1678. And all of them were equally pure?—All of them were equally pure.

1679. Can you account for the variation in price?—The circumstances of the locality may account for it; there is in some neighbourhoods a greater competition than in others. Carbonate of soda used to sell at 4 *d.* an ounce, but it has been greatly reduced in price; it might be sold even at less than a penny, but there is no object in cutting down the price below that.

1680. Would the difference in the locality occasion 100 per cent. difference in price?—Yes; if it were purchased by the pound probably there would not be so great a difference.

1681. Mr. *Swift*.] The sample shown you by Dr. Normandy, you said, would not have been injurious; if it had been prescribed as a medicine would it have produced any effect, or would it have been valueless?—Its value would have depended on the proportion of carbonate of soda contained in it; it contained 88 per cent. of carbonate of soda; the only objection to the presence of sulphate of soda is, that if a medical man had ordered 20 grains of carbonate of soda, it would in this instance be giving 18 grains only.

1682. Viscount *Goderich*.] You stated, did not you, that you did not go yourself to purchase these specimens?—I purchased some of them myself, but not the whole

whole of them. My two assistants were engaged in procuring them, and brought them to me with the addresses.

1683. Your assistants would doubtless be well dressed persons, not coming in the character of poor people at all?—That is so, no doubt.

1684. Have you any reason to suppose that a different description of medicine is frequently sold to poor persons from that which is sold to persons having the appearance of being in a different position of life?—Not in the same establishments. There may be such a difference as this: in the case of rhubarb, for example, there are two varieties commonly sold, Turkey rhubarb and East Indian rhubarb; the Turkey rhubarb is dearer than the East Indian; and a poor person would probably purchase the East Indian, which, however, is quite as efficacious as Turkey rhubarb.

1685. Mr. *Villiers.*] I suppose it is possible that there might be two samples of the same article in the same shop?—It is possible; but I do not think it is at all likely, especially in an article of this description.

1686. Viscount *Goderich.*] Do you suppose that your two assistants are at all known in the trade personally?—I believe they were not known in any one of those places from which they obtained those. They were generally questioned as to the purpose for which they wanted them. I may state, that in buying the carbonate of soda they purchased at the same time some calomel, and in getting the calomel they were always questioned as to the purpose for which it was intended, and whether they knew how to use it.

1687. Mr. *Villiers.*] To the best of your belief they did not tell the real purpose for which it was required?—I particularly questioned them upon that point, and they said that in no instance did they state for what it was intended, or for whom it was purchased. With regard to calomel, that is one of the substances the purity of which has been called in question; it has been stated that calomel is adulterated with as much as 60 per cent. of carbonate of lime or sulphate of baryta; now, according to my experience, calomel is not adulterated, and as met with in commerce it is in a great state of purity. In this respect I consider it to be irreproachable. I obtained 51 samples of calomel from the same localities as the soda was got from, but some of the samples had been procured before I gave the instructions for the carbonate of soda also to be obtained.

1688. Mr. *Swift.*] They were not procured at the same time, were they?—Forty of them were procured at the same time as the carbonate of soda; the others had been previously procured.

1689. Mr. *Villiers.*] What quantity of calomel did you purchase in each shop?—Twenty grains in each instance.

1690. Would not that be a larger quantity than would be usually given as a dose; and therefore would not that raise suspicion in the sellers that it was sent for by some medical man?—Not so; the general question is, "Do you know how to use this; you are not going to give that all in one dose, I suppose?" A penny would have been paid by a poor person for a grain, and for two or twenty grains.

1691. Is it usual for a poor person to go into a chemist's shop and ask for 20 grains of calomel?—It is not unusual. I may state that in the localities which have been referred to as those in which the adulteration of drugs principally exists, medicines are rarely dispensed from prescriptions. In reference to the majority of the druggists from whom those specimens were got, they would not have a prescription once a week, or some of them not once a month, to make up. Their business consists in selling drugs to poor people, who doctor themselves. They get a little advice with the medicine from the druggist occasionally, that is to say, if they buy rhubarb they inquire how they are to use it, if they do not know; therefore it is for domestic use that those things are sold. That is almost the whole of the business of those little druggists in such localities as I refer to.

1692. Is it not rather in localities of that character the custom of the poor to go into a chemist's shop and state the nature of their complaint under which they may be suffering, and ask the chemist to prescribe or mix them up a quantity of medicine to be used in such a case?—That is frequently done in trifling cases, but to my knowledge it is not unusual for the poor to go in and ask for 20 grains of calomel, and use it in their own way. These 51 samples of calomel were all examined by me, and there were none of them adulterated. One sample contained a little oxide of iron, and two others a trace of oxide of iron. This, of course, would not be for one moment set down as an adulteration; it was a slight impurity arising from the manner in which the calomel is made, it being sublimed in iron vessels,

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vessels, but with the exception of this one sample, and the two which had a mere trace, the others were in a condition approaching to chemical purity. That confirmed my previous opinion, that there is no country in the world where calomel is so well made as it is in this country. English calomel is celebrated everywhere for its good quality. The process by which it is now made abroad was introduced from this country, and the makers of English calomel are much above the practice of adulteration. Those who retail it have no sufficient object in adulterating it; a pound of calomel would last a little shop, such as I have referred to, for a twelvemonth or more. That pound of calomel costs him 3*s.*, and he sells it out in quantities of two grains or three grains up to 20 grains, and he gets thereby a large profit upon it; what motive has he or any one engaged in the commerce of it to mix with it 20 per cent. or 30 per cent. of foreign matter?

1693. *Chairman.*] What class of persons are they who manufacture calomel?—Chemical manufacturers. Howards, of Stratford, are celebrated manufacturers of mercurials; Davy, M'Murdo and Company, May and Baker, and others, these are all highly respectable chemical manufacturers. Iodine is another article which was mentioned as being adulterated; it was represented as being adulterated with water and black lead. In the first place, I have made diligent inquiry among some men who deal in iodine on a large scale, and they all assure me that such a thing as adulteration with black lead has never come under their notice. It has been mentioned in some chemical books as having occurred on the Continent; but I may say that cases of that description get chronicled. If an adulteration of that description is once detected, it finds its way into chemical books, and is referred to for half a century afterwards, though it may never have happened more than once.

1694. Mr. *Villiers.*] Did you expect those persons to admit that the articles they dealt in were ever mixed with foreign matter?—I only asked for information from those who were most likely to possess information with reference to the article as it came into the hand of the manufacturer. If they knew of it, it would be to their interest to state that adulteration existed, because if it existed it would be a fraud upon them; they are persons who are manufacturers, and who use it in manufacturing operations.

1695. They were not people who could ever have used it themselves?—They were not persons who would sell it in an adulterated state; in fact, it is not sold in a state in which it could be adulterated. In the state in which it is used in medicine, the state in which it is in the hands of the retailer of drugs, it is in a purified state, sublimed. Iodine in its crude state, as it would be met with in the wholesale market, contains variable quantities of water. Crude iodine comes to London from Glasgow and from Ireland, where it is manufactured, in little barrels or kegs, and it is in a more or less moist state. That water is an impurity certainly, but it is freed from that water before it passes into the hands of the retailer; it is sublimed, and it is sublimed iodine which is used, and that is not liable to the adulteration which has been mentioned; it is a perfectly dry substance. Water would at once bespeak its presence, and the iodine would be unfit for use.

1696. Viscount *Goderich.*] Have you established that iodine cannot be adulterated by black lead?—In what I said I referred more particularly to water; black lead might be mixed with it certainly, but if it were it would completely alter the character of the iodine; it would be at once evident to the senses, and no man who was acquainted with his business would be likely to be imposed upon by any such fraud as that.

1697. Mr. *Villiers.*] Would the customer be likely to be imposed on?—The customer might be, but I apprehend that no one who has given evidence here would pretend to insinuate that those who are retail dealers in those articles are adulterators, or that they are cognizant of the adulterations, even where they exist; if so, it would be very far from the truth, I conceive.

1698. Why?—I conceive that their position places them, generally speaking, above suspicion. The body of chemists and druggists are a highly respectable body of men in this country; I believe they have done much towards checking and exposing adulteration; all that has been done has been principally done through them; it is they who are constantly finding out cases of adulteration and exposing them. If adulterations take place, they take place in the goods before they reach their hands, and they are the parties who are imposed upon as well as the public by it.

1699. Is not the price sometimes affected by adulteration?—Very generally; it is affected in a certain class of articles which I will refer to by and by. The principal origin of adulteration there is no doubt is competition in price, the running down of prices; it originates in the public more than any one else; the public will get cheap goods; they buy where they can get things cheapest. The retailer who supplies the public goes to the wholesale man and says, "I must sell at such a price, you must supply me at such a price." The wholesale man supplies the best article he can for the price the public will pay; the retailer may not be aware that in those cases he is selling an adulterated article, and very frequently even the wholesale dealer may not be aware of it.

1700. Viscount *Goderich.*] You say that the retail dealers have done a good deal to detect adulteration. Who is it who are the adulterators of goods, in your opinion? To whom do you ultimately bring the charge home?—There is a certain amount of adulteration which is effected by the drug-grinder. The greatest amount of adulteration in drugs takes place probably at the drug mills, where the drugs are powdered. Drugs generally do not admit of adulteration in their original state. If you take rhubarb or jalap, or things of that description, the great majority of drugs are of vegetable origin, and in the state in which they are brought into this market they do not admit, generally speaking, of adulteration. When they are reduced to powder the detection of the admixture of foreign matter becomes much more difficult, and it is drugs which have been submitted to such a process that are principally adulterated.

1701. That adulteration, you say, you consider takes place to a considerable extent?—It does; it has taken place to a very great extent; but for many years the body of chemists and druggists have set their faces against the practice, and much has been done towards mitigating it.

1702. The adulteration was done by the drug-grinders for their own benefit?—The drug-grinder is employed by the wholesale druggist to reduce drugs to powder. The wholesale druggist will send, for instance, a cwt. of jalap or rhubarb to the man who grinds drugs for the purpose of powdering them. A practice existed in this country a few years ago generally among the drug-grinders, and up to the present time it exists to a certain extent, that the drug-grinder has to return to the wholesale druggist within 4 per cent. of the quantity of the drug which was sent to be ground; so that if a wholesale druggist sent 112 lbs. of jalap to be powdered, he would expect to receive back 108 lbs.; it was a conventionality between them; it was the rule which had been adopted, and I believe it was adopted with this object. There were, in fact, two objects in adopting it. One was, that previously to the adoption of that rule there was a constant source of dispute between the grinder and the wholesale druggist. Those drugs are in very variable conditions, in their original state, as to moisture, and lose variable amounts of weight in grinding. In one case if 112 lbs. of jalap were sent to be ground, the grinder would probably send back 104 lbs.; in another case 100 lbs.; and the wholesale druggist would frequently complain, and fancy that some of the jalap had been purloined. At last they came to an accommodation between them, that they should strike an average, that in all cases 4 lbs. on the cwt. should be allowed for loss in grinding. That is popularly called the 4 per cent. system, but the centum is in fact 112 lbs.

1703. *Chairman.*] If one sample contained 5 lbs. of water, and another contained 15 lbs., would both be returned at 108 lbs. instead of at 112 lbs.?—Yes.

1704. What would constitute the difference in those cases; how would it be made up?—The difference was made up, no doubt, by the introduction of inert matter into the powder. The process of drug grinding is effected by means of what are called stone runners, a pugging mill, a mill consisting of two large cylindrical stones made to trundle round a central axis. When the mill has been used for grinding one substance, jalap for instance, before it is employed for grinding another substance it has to be cleaned, and the process of cleaning consists in grinding sawdust in it. Sawdust is put in and ground till the mill becomes clean by that means. I have reason to believe that the inert matter with which the quantity of those drugs was made up was this sawdust, which was a necessary material in the drug mill.

1705. Viscount *Goderich.*] Must not the wholesale druggists have been aware when they got their goods back, that they were mixed with a quantity of what you call inert matter?—No doubt they must have known that something was introduced.

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1706. Supposing them to get back two samples of an article, one containing a small amount of inert matter, and another containing 5 or 10 per cent., would they sell those articles at the same price?—Perhaps I may be allowed to state what I believe to have been another motive to the adoption of that practice. The other motive to the adoption of what was the general practice till quite recently, arose from the fact, that wholesale druggists are accustomed to have an established relation in their price lists between the drug in its crude state and the drug in its powdered state. Thus, for instance, a wholesale druggist will send out a price list, in which he will quote jalap root, say at 2*s.* 8*d.* a pound, and jalap powder at 3*s.* 2*d.*; 6*d.* a pound is what they put on for powdering; the difference between the raw material and the same material powdered would be generally 6*d.* a pound. Now, in order that he should secure himself against loss, it would be necessary that there should be some uniform relation between the quantity of matter before it was powdered and after it was powdered. Those two I consider to have been the sources of the practice; the practice, however, has been greatly discredited. I have taken a great deal of pains myself, and I have contributed much to the exposure of the practice; and the practice to a great extent is falling into disuse.

1707. The answer to my question therefore would be, that in the case which I put, the wholesale druggist would sell the two articles at the same price?—Certainly; the system would enable him to keep a uniformity of price.

1708. Mr. *Swift.*] The adulteration is actually at the desire, therefore, of the wholesale druggist?—It is so in that case.

1709. Mr. *Otway.*] Do you know of any cases in which the drug-grinder is a drug seller?—Since attention has been directed to the subject of adulteration of drugs during the process of grinding, some of the wholesale druggists have fitted up mills to grind their own drugs. I know of no case in which a man who is known by the profession as a drug-grinder, deals in drugs; they do not generally deal in them, but wholesale druggists have made themselves grinders with a view of protecting themselves against that fraud. I may state that two of the principal drug-grinders in London at the present time have entirely repudiated the practice, and another, making the third of the principal drug-grinders in London, has almost entirely relinquished it, and adopts it only in special cases when he is required by his customers to adhere to that practice; I believe that many drug-grinders are highly respectable traders, who would be very glad entirely to do away with this, which they feel to be an evil.

1710. Viscount *Goderich.*] I gather from your evidence that you entirely acquit the retail dealer in drugs of all responsibility for adulteration, and divide the responsibility of whatever adulteration does take place between the wholesale druggist and the drug-grinder?—I do so with reference to what would be commonly termed adulteration; I must admit that among retail druggists, practices of this description are sometimes resorted to. In making some of their preparations, tinctures, for instance, they will sometimes not use quite the full amount of spirit; where proof spirit is ordered in making a tincture, they will put rather more water than will be consistent with the production of a spirit of that strength, but as to any systematic adulteration of drugs, I conceive that the retail dealers are not at all chargeable with any such practice.

1711. Even in the smallest shops in the poorest districts?—Certainly, I think they are as free from it in such localities as anywhere.

1712. Mr. *Villiers.*] Did you say that the wholesale druggists now frequently grind for themselves?—Yes.

1713. That offers no greater security to the public, according to your former statement?—No, it only puts the responsibility upon a smaller number of shoulders.

1714. Viscount *Goderich.*] In a case in which the wholesale druggist grinds for himself, does he retain the same relation between the price of the unground drug and the ground drug which exists in the other class of druggists who employ a drug-grinder?—That I am not able to say.

1715. If he did, he must either mix his drug with what you describe as inert matter, or suffer a loss as compared with the wholesale druggist who employs a drug-grinder?—Yes, or he may be satisfied to take an average of profit and loss.

1716. Mr. *Otway.*] I presume, in the case of the tinctures, to which you allude, the adulteration would be a clear source of gain to the druggist?—I do not think it would be a source of gain to him; it would enable him to sell the tincture a little

little cheaper. I do not apprehend that those who would make their tincture with spirit rather weaker than is ordered would get a better profit; but it is adopted in those localities where there is competition in price, and they sell at a lower price.

1717. Mr. *Villiers.*] You do not deny, do you, that there are adulterations; you only tell us that the druggist is imposed upon himself; you would not dispute the general opinion among medical men that you must be careful where you get your medicines mixed up, because you are so likely to be imposed on?—I think the evil has been greatly exaggerated; and more especially by the gentlemen who have given evidence before this Committee.

1718. It is the fact, is not it, that medical men are in the habit of advising their patients to take care where they get their prescriptions made up?—Certainly.

1719. Therefore it is the opinion of the profession that it is a very general practice to adulterate medicines?—Not a very general practice.

1720. It is very general among medical men to give this advice, is it not?—Yes; it is not only the fear of adulteration, but I must speak of another circumstance which induces the necessity for exercising some discretion in selecting a good from a bad druggist, namely, that among the generality of drugs there is a great disparity in point of quality; if you were entirely to put a stop to adulteration you might have as great a disparity in the quality of medicines as you have now; none of those drugs are in a uniform state. Nature does not present us with those things always in the same condition; nature is, in fact, by far the greatest adulterator. If you take jalap, or rhubarb, or myrrh, or opium, or any of those things which are derived from the vegetable kingdom, you can never get two samples which are identical; those articles come over to this country differing very much in quality; it requires the exercise of much skill and experience to select the better class from the inferior, and this selection is made. When a chest of jalap comes into the market it is always sorted; an original package of jalap root will consist of good, bad, and indifferent, and a merchant makes an assortment of those; he selects out the best pieces for those customers who are willing to pay the best price; there is another portion which will be somewhat inferior in quality, which will fetch a lower price, and there will be some portion of the chest always which will be very inferior, which is sold at a low price to the poor.

1721. There is such a difference in medicines from their not being pure, that medical men are in the habit of cautioning those whom they attend as to where they get them?—Yes. I have yet many cases of adulteration to speak of. My great object has been, in the first instance, to distinguish between impurity and adulteration. I commenced by referring to such a distinction in chemical products, and I wish to draw a similar line of distinction among those drugs which are of natural origin and derived from the vegetable or the mineral kingdom.

1722. If they were inferior, you say the price would be lower; but if the same price which is given, or ought to be given, for the best article, is charged for an inferior one, that is not fair play, is it?—No; but I do not apprehend that that is the practice. Where drugs of inferior quality, or adulterated drugs, are sold, it is because the public will get them at a low price; it is to meet the competition in price that this principally occurs. If you go into any respectable neighbourhood, to any well-educated, respectable druggist, you have no difficulty in getting drugs of the first quality. Much has been said of Apothecaries' Hall, as if they had some exclusive privilege for the sale of good drugs; but the drugs are no better there than they are in hundreds of other respectable establishments.

1723. Take such a thing as cod-liver oil; is not it notorious that many medical men confine their patients to one or two places in London because they cannot get it pure elsewhere, owing to the fact that the persons who do adulterate charge for a good article and sell an impure one?—There is no doubt, in reference to cod-liver oil and other substances, that medical men do recommend their patients to go to particular establishments, where they feel confidence; not that those medical men, in the majority of cases, have any sufficient evidence that in other cases the drugs would be adulterated, but simply that they know a particular individual or a particular establishment, and they have confidence there; they do not know others, and they have heard a good deal said about adulteration, though they have no positive knowledge on the subject. Generally speaking, they are very deficient in positive knowledge upon the subject; they know that the efficacy of their medicines greatly depends upon the quality of them, and they are therefore anxious

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that they should be got from a place where they have confidence that the medicines will be pure.

1724. *Chairman.*] Is not it within your knowledge that cod-liver oil is very extensively adulterated, and that it is very difficult to obtain it pure?—No, it is not within my knowledge; I believe that cod-liver oil is adulterated, but I believe that it is not extensively adulterated. There are many establishments in London, and in the country also, where they make their own cod-liver oil, and in those establishments, of course, they can be quite certain that the article is genuine. There is a great deal of cod-liver oil imported into this country from Newfoundland and from other places, which is quite genuine; it may, nevertheless, be not quite so good. It is not, generally speaking, so free from flavour as that which is prepared in this country. There is a great difference in quality, and I believe there is some adulteration, but I do not believe that that adulteration is extensive.

1725. With respect to sarsaparilla, do you believe that to be very generally adulterated?—No.

1726. Do you believe it to be very possible to obtain pure decoction of sarsaparilla; is that to be obtained in great purity in this country?—I believe it is; there is a great difference in the quality, but I believe it is all sarsaparilla. There is a great difference in the price of sarsaparilla; the sarsaparilla which is the most highly approved is Jamaica sarsaparilla, which is much more expensive than Honduras or other sarsaparilla.

1727. You do not know of any cases in which a great portion of the sarsaparilla consists of liquorice?—I have never met with such cases.

1728. Viscount *Goderich.*] Have you made many analyses of drugs with a view to detecting adulterations, previously to the appointment of this Committee?—I have; I had been engaged in that inquiry constantly for the last 14 years. I am frequently appealed to by members of the Pharmaceutical Society. I may state that since the establishment of the Pharmaceutical Society, one of the charges which has been urged against that society by some of the merchants in the City is to the effect, that it has made their customers much more troublesome than they were before. Since the establishment of the Pharmaceutical Society a much greater amount of information has been diffused among the class of chemists and druggists; they are constantly inquiring into the purity or adulteration of substances which are supplied to them by wholesale druggists, and I am frequently referred to by members of the society in cases where a dispute arises as to whether an article is pure or not.

1729. The evidence you are giving is the result of a long series of inquiries, not the result of your investigation into these 50 samples, which may have been delivered to you pure under the circumstances of the moment, when everybody probably is a little inclined to be careful as to what goods they sell?—I am speaking of the result of my experience during the last 30 years, during the last 14 of which I have been engaged professionally as an analytical chemist.

1730. Mr. *Otway.*] I understand you to say that different qualities of drugs are sold by different druggists; does not it occur to you that in the case of a certain prescription a person purchasing an old or damaged article would suffer as much as if he purchased an adulterated article?—Certainly.

1731. You admit that damaged drugs are frequently sold by a great many druggists?—In reference to that I must explain that I believe drugs are sorted according to their qualities; it is according to their external qualities that they are sorted. If you take, for instance, two samples of jalap; they may differ in external character and commercial value greatly without differing to any great extent in their medicinal qualities; that which is inferior in reference to those external qualities may be as good a medicine as the other; but there are many drugs which are damaged, in the sense in which you use that term, which are inferior in quality to that extent.

1732. Is it not true that the majority of chemists do not analyse the drugs they purchase themselves, but that they judge of a drug according to the price which is asked for it?—According to the price and according to external characters; that I would say is the practice in the majority of cases; but the number of druggists who are quite capable of analysing their own drugs, and who make a constant practice of doing so, has very greatly increased within the last 10 or 14 years; and at the present time there are a large number throughout the country

who

who are accomplished chemists, quite as competent to examine drugs as I should be myself, or as any gentleman who has given evidence here would be.

1733. Though the number of chemists competent to analyze has been increased, the majority of chemists do not analyze, but judge of the purity of their drugs from other circumstances?—Certainly.

1734. Viscount *Goderich.*] Did you hear the statement made by Dr. Thomson, to this effect, "I have been told that there are druggists, at least one druggist, who would sell any powder you please at 36 *s.* the cwt."?—I did hear that statement.

1735. Have you any knowledge which would enable you to say that that statement is not correct?—I am not able to contradict that statement. I have heard that statement, and I have reason to believe to some extent it is true; perhaps not to the full extent; but there is a good deal of foundation for the statement.

1736. Do not you think that retail druggists, purchasing of a wholesale druggist all the various powders they might require at the same price per cwt., must be aware that a great proportion of them are adulterated?—It is not the practice to purchase them all at the same price. It amounts to this: there is a large chemical manufacturer in this country who has stated, that if an order be brought to him for an article at a certain price, he considers that his conscience is absolved from all responsibility, and that he will supply an article at the price which is quoted, producing the best thing he can; on the man who gets it he puts the responsibility. Articles were at one time very largely exported to some parts of South America, and to some of the States of North America, and they were manufactured in that way; there were cases in which blue pill was sold at an extraordinary low price; those substances were traced to the manufacturer; he excused himself thus: a merchant says, "I have an order to ship so much blue pill at such a price; can you produce it?" He says, "I can make you what I dare say will pass," and he produces the best thing in his power, which he says is in value equal to the price given, but certainly is not the blue pill of the Pharmacopœia. So if an order is brought to him for any substance, he would execute it just as a manufacturer at Manchester, if cotton goods are ordered at a certain price, will make the best thing he can for that price.

1737. Do not you consider that to be an imposition upon the public?—Yes; and such a state of things ought not to exist.

1738. Mr. *Moffatt.*] Are the Committee to understand from your answer to a question put to you, as regards the practice of physicians in recommending particular druggists for making up their prescriptions, that that is the general practice or rule of physicians when they give a prescription to their patients?—No, it is not the general practice by any means; it is rather an exception; it is a practice which is taken exception to by many druggists, and by others also. It is considered in the profession not to be a desirable practice.

1739. Is it not a practice rarely adopted by physicians, except in reference to some special and particular drug, as to which they have confidence in one druggist rather than in another?—There are some physicians who make a practice of recommending some particular chemist.

1740. Do those physicians form the rule or the exception?—I think they form the exception.

1741. Is it not also requisite, in the preparation of prescriptions, that there should be a certain amount of skill in mixing the medicines, and may not that have some reference to the question in the mind of the physician?—Certainly.

1742. It is not only the purity of the medicines which is required, but there must be skill in the preparation of them?—Yes.

1743. Viscount *Goderich.*] Is there any skill required in selling a bottle of cod-liver oil?—No; but there is judgment required in the selection of the article.

1744. Mr. *Villiers.*] You are not a medical man yourself, are you?—I am not.

1745. Mr. *Moffatt.*] But you have a very intimate acquaintance, I presume, with the properties of drugs?—Certainly; my time has been fully occupied for the last 30 years in the practice of chemistry and pharmacy.

1746. Mr. *Swift.*] The inferior qualities of drugs, you say, are confined to the poorer neighbourhoods?—Generally.

1747. And that is on account of the competition in price?—Yes.

1748. You referred to the bicarbonate of soda just now; you said that the samples you had procured were nearly in every case of equal quality?—Yes.

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1749. How do you reconcile that fact with the other which you mentioned, that the samples obtained in the poorer neighbourhoods were sold at a penny, whereas in the better neighbourhoods they were sold at twopence?—The fact is, that even at a penny an ounce the profit is an ample one; it might be sold at a farthing an ounce; but it is a mere question as to what the extent of reduction in the price should be. Take the case of Epsom salts; they are rarely sold at less than a penny an ounce, but they might be sold at a penny a pound, I was going to say. I referred to the article of magnesia, which has been alluded to as being adulterated with lime. According to the result of my experience it is never adulterated at all; magnesia does, generally, contain a little lime, but that is the result of an imperfection in the process by which it is manufactured. It is procured from magnesian limestone, but that is not an adulteration; it is an impurity resulting from the adoption of a cheap process of making it. Of late years the manufacture of magnesia has been considerably improved, and it is not in such a state of impurity, as met with in commerce, as to be objectionable on that score.

1750. Mr. *Villiers.*] Do you say that it would not answer to adulterate magnesia?—I do not consider that it would.

1751. That would be the best reason for considering that magnesia is not adulterated?—Lime is an article which, if it could be introduced in any quantity without being detected, would cheapen the product materially, and it would be worth while, on that score, to introduce it; but practically, as the result of my experience, I have examined a great number of samples, and I never met with any which I had reason to believe contained lime, as introduced for adulteration.

1752. Have you found any other adulteration?—No.

1753. It is as pure as carbonate of soda?—Yes; there is no difficulty in getting good magnesia in any part of the country.

1754. Viscount *Goderich.*] What do you consider to be the difference between impurities and adulterations?—I consider adulteration to be the addition of some substance with a view of deteriorating the quality of the body to which it is added.

1755. Mr. *Villiers.*] And for the purpose of profit?—Yes, with a view of cheapening it.

1756. Viscount *Goderich.*] Should you consider that the existence of extensive impurity, by which I suppose you mean the presence of foreign matter to a considerable extent, would not be an adulteration in case the article were sold at the same price at which it would have been sold had it been free from that impurity?—I think it would be desirable not to mix it up with the question of adulteration. Thus, for instance, the case of carbonate of soda. Carbonate of soda, as used by washerwomen, contains frequently a very large quantity of sulphate of soda; that is to say, there has been very little pains taken to purify it; I would not call that adulteration.

1757. Would you call it an adulteration if it were sold, not for the purpose of washing, but for the purpose of being used medicinally?—No, I should call that the use of an impure article legitimately produced for a particular purpose, and quite applicable to the purpose for which it was originally intended, for a purpose for which it never was intended.

1758. Still that is an objectionable proceeding, is not it?—Certainly.

1759. You consider that the presence of certain descriptions of impurities is objectionable, and that it may be turned to an improper purpose, though you would not call that an adulteration?—Certainly; with reference to what I consider, strictly speaking, to be adulterations, I consider that there are two classes of adulterations, fraudulent adulterations, and what I would distinguish as conventional adulterations; by the latter term I mean to designate those cases in which the sanction of the consumer is given either directly or indirectly to the practice. Cases of fraudulent adulteration in regard to drugs are, I am of opinion, of rare occurrence, and when they occur they are generally of short continuance; I mean to say, that as soon as they are detected they are put a stop to; those who are defrauded are put upon their guard, and that particular adulteration cannot when once detected be repeated.

1760. Mr. *Villiers.*] Between the same vendor and the same customer, that is?—Yes; or if the cases are made public, with reference to all those who are acquainted with the fact.

1761. Would it apply further than to the particular shop where the adulterated drugs

drugs were sold?—Yes; I am going to enumerate those cases of fraudulent adulterations which have come under my cognizance during the last 14 years. Since the existence of the Pharmaceutical Society, I believe all cases of fraudulent adulteration which have been brought to light have been brought under the cognizance of the society, have been noticed in the Journal of that society, and the members of the society have generally contributed to the exposure of such cases.

1762. Did you hear Dr. Thomson say that he had given evidence so far back as the year 1830, on the subject of the adulteration of drugs, and that he finds the same adulterations now going on that he did then, in consequence of no check having been provided by the Legislature after that inquiry?—I think Dr. Thomson is very much deceived upon the subject. I shall have occasion to refer to one or two points which he included in his evidence, in which he shows that he is not acquainted with the facts of the case. I will mention now the cases of fraudulent adulteration which have come within my cognizance during the last 14 years. Some years ago, it was found that morphia was adulterated; one manufacturer adulterated it by the introduction of a portion of sugar, and was enabled thereby to undersell other makers; the very fact of his being able to undersell his competitors led to a minute examination of what he was supplying to his customers; the fraud was detected; it was exposed, and there was an end of it; it could not be repeated, and it was not repeated; that is to say, it could not be repeated without its being speedily detected. The public were put upon their guard; I mean here by "the public," those who were dealers in the article; and no similar case has subsequently been brought to light. Another case occurred in which opium was introduced into this country which was a completely fabricated article, containing no morphia.

1763. Where did it come from?—From abroad; but it could not be traced; it was not known what its original source was.

1764. How long ago was that?—It must have been 10 years ago; I have a sample of it here; it was offered in the market; it was examined by those who were accustomed to use opium and they found it to be worthless; it met with no customers. It went to France; it was noticed in the public journals in France, and it was not sold there; in fact the fabricator had outwitted himself; he made it so completely worthless that its detection was not difficult.

1765. Had it no property of opium?—None of the soporific qualities of opium. A few years after that there were some medicines, known as the valerianates of zinc, iron, and quinine, which were then introduced into medical practice, and it was found that one of the makers of those articles was substituting comparatively valueless products, which were merely flavoured with the essential oil of valerian, and selling them for the true valerianates; in that case he was enabled to undersell his competitors. It led to an investigation of the subject; the fraud was detected, and the practice was at once suppressed. Isinglass was another substance which was adulterated; and this adulteration came specially under my own notice. I have here a specimen of adulterated isinglass which was examined by myself; it was adulterated with gelatine, by rolling a sheet of gelatine between two sheets of isinglass, and then cutting it up in the usual way.

1766. *Chairman.*] Would the public be able to detect the difference?—No, not at all.

1767. What would be the proportion of the gelatine to the isinglass?—There was about one-third of gelatine.

1768. What is the difference in price of the two articles?—The difference is very great. The gelatine which was used was worth about 2*s.* a pound, and the isinglass adulterated with it was worth about 16*s.* a pound. That was a fraud upon the pocket. The qualities of good gelatine are equal to those of isinglass.

1769. Mr. *Swift.*] Would an ordinary chemist be enabled to distinguish the difference?—That was principally distinguished by the microscope.

1770. Viscount *Goderich.*] Do you believe gelatine to be mixed with or substituted for isinglass commonly, or do you consider the case you have mentioned to have been a peculiar and singular case?—This was a singular case. The practice I have reason to suppose was entirely stopped upon its being exposed.

1771. When did you make this examination?—In 1850.

1772. Are you aware that Dr. Hassall states in his book that he examined 28 samples of isinglass, and found 10 of them to consist entirely of gelatine?—That I consider to be quite a different case. The cases referred to by Dr. Hassall are cases in which a very superior class of gelatine has been sold for isinglass. As

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I have already stated, gelatine may be produced which is in every respect equal to the best isinglass.

1773. What is the object of calling it isinglass?—The public are attached to the name. The name of gelatine has been generally associated with a very inferior description of gelatine. Of late years a very superior description of gelatine has been produced, which is quite as good as the best isinglass; and there are some houses of very high standing who, when they are even asked for isinglass, sell this superior description of gelatine. It is sold, I believe, under the name of patent isinglass.

1774. *Chairman.*] Do you conceive that to be justifiable?—No, I do not consider it is justifiable to use the name. I am not quite sure, however, that Dr. Hassall may have been entirely right in what he states; I have been assured by the manufacturers of the kind of article referred to that isinglass is, at any rate, to some extent, used in the production of that gelatine. All that he would be able to say would be this, that it had been in solution. Isinglass, as it is commonly sold, is a tissue which has never been dissolved; it consists of the tissue of the swimming bladder of the fish in its ordinary organised condition. If the isinglass is dissolved in water and evaporated, and cut up, it would be essentially the same thing; but Dr. Hassall would not be able to distinguish it from gelatine.

1775. Mr. *Moffatt.*] Is it your opinion that any injury accrues to the public health by the sale of gelatine under the name of isinglass?—No.

1776. *Chairman.*] Is it your opinion that injury arises to the public pocket by the substitution of gelatine for isinglass?—In this case it was so; but the sort of gelatine referred to by Dr. Hassall, I believe, is as good as the best isinglass.

1777. Mr. *Villiers.*] You mention this in speaking of that class of adulterations which you call fraudulent?—Yes. Another case which has come under my cognizance was one in which borax was adulterated; it was found to be mixed with phosphate of soda, but as soon as the adulteration was detected, it was put a stop to.

1778. Was that a very striking instance in the way of fraud?—Not very so; borax is principally used in the arts; it is very little used in medicine; and this fraud was very easily detected, because the phosphate of soda was efflorescent and borax is not so. It was the crystals of one salt mixed with the crystals of another.

1779. Was it done upon a large scale?—It was as supplied to the merchant, but the fraud was detected. It was at Liverpool. Another case which has been brought under our notice is that of the adulteration of lard. Lard is imported from America in large quantities, some in bladders and some in firkins. This lard is frequently mixed with flour. I am now, of course, speaking of those substances which come under the cognizance of druggists. Lard is used in medicine, and in applying it to certain pharmaceutical purposes this fraud has been detected. That has not been put a stop to, because the original source of the adulteration is beyond our reach, it coming into this country in this adulterated state.

1780. If it were not used after it arrived they would not send it in that state, would they?—No, probably not.

1781. Does it interfere very much with the purposes for which you use lard?—There are many purposes to which lard is applied; since this adulteration has been detected I apprehend it would be very little used by druggists; but it would still find its way into the hands of the cook; it would be sold by the butterman, who deals in lard.

1782. Does that come from North America or from South America?—From North America.

1783. I suppose it would answer pretty well to mix it with flour?—Yes.

1784. Do you know what proportion of profit is derived from that adulteration?—I do not.

1785. Would it be difficult to ascertain that?—Not at all.

1786. Viscount *Goderich.*] Lard is manufactured in England; do you consider that the English lard is adulterated?—It is not, I believe; I have never met with a case in which it was so.

1787. Mr. *Swift.*] Have you ever heard of extensive manufactories in Bristol and Liverpool for the purpose of adulterating lard?—No, I have not.

1788. Viscount *Goderich.*] Have you ever examined English lard?—I have not specially examined it. I will mention another case, which was not strictly one of fraudulent adulteration; but it is one which, nevertheless, I wish to bring under the notice of the Committee, because it shows that the druggists are constantly

stantly upon the alert for the detection of the substitution of one article for another; a case occurred not long ago, in which a medicine which consists of iron reduced by hydrogen, was found to be not in the state in which it purported to be; one of the oxides of iron was substituted for it; I believe in that case the manufacturer was not aware himself that he was selling for pure iron, or iron reduced by hydrogen, another substance; but it was speedily detected. Competitors in business are always on the alert to find out these things, and I consider the most efficient means for their detection exists at the present time in that way.

1789. Viscount *Goderich.*] That argument would of course apply equally to any other trade as well as to that of druggists?—Not so much so; because druggists possess an amount and description of knowledge which enables them to detect these adulterations.

1790. Surely a baker would be easily able to detect whether bread was adulterated with alum or not?—No; I think it would sometimes be a difficult thing even for a chemist to do that; the baker could say whether he had put alum in or not; but if the miller had put alum into his flour, I apprehend the baker could not detect it.

1791. Mr. *Villiers.*] You consider that competition is a great check?—Yes.

1792. Competition reduces the price, does not it?—It leads to a reduction of price.

1793. Adulteration is rather a consequence of the necessity for reducing the price, is not it?—Yes.

1794. Therefore competition is rather an evil, inasmuch as it tends to increase adulteration?—When I spoke of competition leading to the detection of adulteration, I spoke of that legitimate competition which always exists between men in the same line of business; if two men are manufacturers of morphia, and one is enabled to undersell the other to the extent of 2 *d.* an ounce, there is at once a motive in the man who is undersold to endeavour to ascertain whether his competitor is selling a genuine article or not. I do not consider that the adulteration of morphia could exist in this case for 12 months, without detection.

1795. Viscount *Goderich.*] You also stated that the keenness of competition was the great motive for resorting to adulteration?—Yes, I admit that.

1796. Mr. *Moffatt.*] With the exception of one or two cases, these classes of adulteration have ceased?—Yes.

1797. Viscount *Goderich.*] Are you sure that all the cases of fraudulent adulteration of drugs which have occurred during the last 14 years have come under your knowledge?—Yes.

1798. Therefore you consider that the cases you have detailed to the Committee, are all the cases of adulteration of drugs which have taken place during that period?—I am excepting the cases I before referred to, which are connected with drug grinding for example. Those were well defined cases, cases in which the adulteration could be readily ascertained.

1799. Mr. *Moffatt.*] Are the Committee to understand you, that you have the means of ascertaining that no frauds have been committed in drugs, without their coming under your cognizance?—No, certainly not; many cases of fraudulent adulteration may have existed, and may exist now, which have never been brought to light; but what I say is, that all those cases of fraudulent adulteration in drugs, which have been brought to light within the period I have mentioned, have come under my cognizance, and I have here enumerated them.

1800. Has the production of drugs improved within your experience?—Very decidedly.

1801. And is that improvement in the quality of drugs continuing?—I think it is.

1802. The general quality is better than it was 16 years ago?—Very considerably better, and as the education and information of the sellers of drugs improves, there will be a continued improvement in that respect.

1803. You mentioned a case of extensive adulteration of morphia; at what period did that occur?—It was about 10 years ago; I cannot give exactly the date.

1804. That system of adulteration has now entirely ceased?—Yes; I have never heard of any since.

1805. Viscount *Goderich.*] You say that a great improvement has taken place in drugs within the period to which you have alluded; in what does that improvement consist?—It consists in the fact that those who are engaged in the commerce

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in drugs, the dealers in drugs, are better educated, better informed, better able to make a judicious selection of the drugs which they use, and better able to detect adulterations if they should exist.

1806. Is not that an improvement in the druggists rather than in the drugs? —The one is concurrent with the other, and arises from it.

1807. What were the circumstances connected with drugs at the commencement of the period you have referred to which have been removed, and the removal of which has occasioned the improvement you have spoken of?—Adulterations at that time arose partly from the more extensive practice of admixture in grinding drugs, partly from chemical and pharmaceutical products not being produced in so perfect or so pure a state as they are now, and other causes of that description.

1808. Mr. *Moffatt.*] Would not an improvement also arise from this, that druggists being better educated and more able to appreciate the superior quality of drugs, such drugs have commanded a higher price in the market, and thereby there has been a greater inducement to import a finer description of drugs?—Yes; I consider in reference to the importation of several drugs that there has been a marked improvement in this respect, and that has originated entirely with the retail druggist. Ten years ago all Alexandrian senna which was imported into this country from Egypt was adulterated with a certain leaf which was mixed with it; the Alexandrian senna contained from 15 up to 20 or 30 per cent. of its weight of this other leaf which was mixed with it. Now, this was so completely an established practice in reference to that substance, that in every work on Materia Medica, Alexandrian senna was described as consisting of those two leaves. The subject was brought under the notice of the Pharmaceutical Society, and druggists were put upon their guard in reference to this article. They began to give the preference to those samples of Alexandrian senna which contained the smallest proportion of this admixture, and the result has been that the commerce in the article has completely changed, and Alexandrian senna now comes into the market almost entirely devoid of the other leaf, because those samples which contain much of the adulteration will not meet with a ready sale. This has entirely originated with the retail druggists, and it has originated in the better information of that class of men. I may give another instance, the case of scammony; a great deal of attention has been directed to the subject of scammony within the period I have adverted to. Ten years ago it was impossible to get a specimen of scammony which was not adulterated. There is no adulteration in it in this country. Scammony, opium and senna, and those things, in their unprepared state, are never adulterated here; they come here adulterated; they are adulterated in the countries in which they are collected.

1809. Viscount *Goderich.*] What was scammony adulterated with?—It was, at that time, principally adulterated with chalk and with flour; some specimens were adulterated with chalk, and some with flour; the preparers of scammony excuse the practice by saying that scammony cannot be collected and preserved without an admixture of some absorbent powder which facilitates the drying of the product; it is a juice which exudes from a root when it is cut; if the juice were collected and allowed to dry spontaneously in the air without any admixture, it is stated that it would be liable to spoil, and its preservation is promoted by the admixture of some absorbent powder; this may or may not, to a certain extent, be true; the practice, however, was to mix some substance with it, in some cases flour, and in some cases chalk; that practice has continued to the present day with reference to the greater part of the scammony which is imported; but the attention of druggists has been directed to the subject, and druggists have been seeking after those specimens which are freest from this adulteration, rejecting those specimens which are found to contain chalk or flour, and now scammony can be met with occasionally entirely free from such adulteration, but it is at a very high price, a price at which it would be impossible to sell it in many neighbourhoods; but those druggists who are more anxious for the qualities of their goods than the price of them, do get it, and I have a specimen here of perfectly pure scammony. The same thing may be said as to opium; opium is an article which never comes into this country free from any admixture; it is not one substance, it is not a homogeneous substance; opium, as every one knows, is a very heterogeneous substance; a mixture of the exudation from the poppy capsule when wounded, with certain impurities, which are scraped off the surface of the capsule in its collection, and other substances which are added during the process; but there is a very great amount of difference in the degree of admixture which is made in opium.

1810. Mr.

1810. Mr. *Gregson.*] The best opium comes from Turkey, does not it?—Yes; and I may here refer to a mistake of Dr. Thomson, who represented Indian opium as pure opium: Indian opium is not an article consumed in this country; none of it comes to this country, and simply for this reason, that it has no sale here on account of its very inferior quality; Indian opium has not one-half the amount of active matter in it which an average sample of Turkey opium contains.

1811. Viscount *Goderich.*] Is that in consequence of any adulteration in India, or is it that it is inferior opium altogether?—Their mode of preparing it is defective in some way or other; certain it is, that it is of very inferior quality.

1812. Mr. *Gregson.*] Are you aware that the preparation of it in India is entirely in the hands of the Government?—It is; the Government appear to be quite aware of its inferiority, because they have placed a restriction upon the introduction of Turkey opium; Turkey opium would be used in India if it were permitted to be imported.

1813. The opium of India must be itself inferior, because it never passes out of the hands of the Government?—Certainly.

1814. Viscount *Goderich.*] Do you say that opium is never adulterated in this country?—I never heard of an instance of it, and I believe it to be impossible.

1815. You entirely differ with Dr. Thomson upon that point?—Certainly.

1816. Mr. *Kinnaird.*] Did not you say that the majority of chemists do not analyse their own drugs?—The majority of them do not, though a large number are in the habit of doing so.

1817. They judge of it, therefore, by the price?—By the price and certain external characters.

1818. How are they better able to protect themselves and their customers than any other portion of the public?—I apprehend that a butcher would be a good judge of meat, without analysing it; he judges merely by its external character and appearance; so a druggist, who all his lifetime has been accustomed to handle drugs, is a good judge of the quality of those drugs by their external character, without resorting to analysis.

1819. Mr. *Moffatt.*] And every other class of tradesmen in the same way?—Exactly.

1820. Viscount *Goderich.*] What do you mean by the "conventional" adulterations of which you spoke?—I mean those adulterations in which the sanction of the dealer or the consumer of the article is given either directly or indirectly. Thus, for instance, if you take the case of opium, you say it is adulterated: but we say that opium is that substance which the public understands by the term, and which the medical man understands. It is not one substance; it is not a pure thing; you may call all those matters which are introduced adulteration, but it is an adulteration which is sanctioned by all the parties concerned in its preparation and use.

1821. Should you consider that the colouring of sugar-plums was a conventional adulteration?—Most decidedly; and the colouring of anchovies with a very harmless substance called bole Armenian.

1822. And the use of copper, to give a green colour to pickles?—That may come under the designation of a conventional adulteration, but not of a harmless character.

1823. In the same way, would the colouring of sugar-plums be harmless?—That depends upon what is used to colour them; they may be coloured by perfectly harmless substances, and if you improve the information of those who are engaged in the manufacture of those things you will entirely remedy the evil.

1824. Are the Committee to understand you to say, that you would not call noxious adulterations conventional adulterations?—A noxious adulteration may be a conventional adulteration; I will explain what I mean. Conventional adulterations I conceive to be those which are caused by the public demanding a certain substance which a dealer has to supply. The public may be deficient in information or in judgment; the public taste may be wrong; the public may want better information upon a certain subject: thus, for instance, the public are accustomed to consider that anchovies are not good unless they are red, and that pickles are better in quality when they are of a green colour than when they are devoid of that colour. There is a prejudice in the mind of the public, and the producer, in order to meet this prejudice, puts in in one case a little bole Armenian, a harmless powder, to give the required red colour, and in the other case he resorts to the use of copper, from ignorance, but still to meet a demand on the part of the public; it is a conventionality between him and the public; the public will have a green

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pickle; neither the one nor the other knows, while the practice continues, what evil has been the result of it; therefore there may be a conventional adulteration which is productive of great mischief.

1825. You said, in your last answer, that the preparers of pickles mixed copper with them in ignorance; do you mean that they are ignorant of the injurious effects of copper?—I believe they were so when the practice prevailed; I do not know whether it still prevails to the same extent that it did.

1826. Everybody knows that a badly tinned copper saucepan is a very bad thing to cook your food in?—Yes; I suspect it was supposed that the small quantity of copper that was introduced in that way would do no harm, just as in France it is well known that sulphate of copper is generally introduced into the bread. The French government has done much to put a stop to the practice; I believe now it is a very minute quantity which is introduced, which gives whiteness to the appearance of the bread, but it is as common a practice as putting alum into bread here.

1827. That practice you say has been put an end to by the interference of the government?—I believe they found that they were wholly powerless to suppress it.

1828. But it has been suppressed, has it not?—It has been suppressed according to the letter of the law, but not practically.

1829. Conventional adulterations, you say, are adulterations which are made by dealers, to suit the public taste?—Yes; among other cases of conventional adulteration, occurring in substances used in medicine, some of which have been referred to at former meetings of this Committee, I may mention the case of calamine; it was referred to by Dr. Thomson, as having existed when he made his Report in 1830, and being found by him to exist at the present time. I wish to explain the circumstances of the case to the Committee. Calamine is a native carbonate of zinc; it is a mineral which is found associated with sulphate of baryta. It is certainly a fact, that for many years past, true calamine has not existed in the market, it has not been an article generally obtainable; it was found many years ago, when the subject was investigated by Dr. Thomson, and it has since been found by others, that sulphate of baryta coloured with a little oxide of iron, was substituted for true calamine. The subject has been very much investigated by the Pharmaceutical Society, and members of the society have taken great pains in endeavouring to do away with the evil which was found to exist in reference to this subject. I have here some specimens—(*producing the same*)—which will serve to illustrate the manner in which the adulteration, or rather the substitution, seems to have been brought about. In the neighbourhood of Matlock, most of the calamine is found. I have here a specimen of the mineral as it is dug out of the earth; this is true calamine or carbonate of zinc; it is found inter-stratified with sulphate of baryta, both being dug out at the same time. There is some difficulty in separating the one from the other; calamine is never a pure substance; it varies very considerably in its general appearance and colour; that substance reduced to powder would constitute the true calamine, and I have here a specimen of true calamine which has been prepared from it. The colour is a dull dirty looking colour; some very choice specimens, if selected, would have a much brighter colour, and the public became accustomed to select calamine and to judge of its quality by the brightness of its colour. Calamine is used only as an external application in ointments. It is a substance which is of little or no medicinal efficacy; it has been used for many years in the preparation of what is called Turner's Cerate, and that is its principal application; in this application of it, it is not easy to discover how much of the effect is due to the medicine which is applied, namely, to the calamine; and hence, therefore, if something else were substituted for it, that other substance, though it should be perfectly inert, might be used for half a century without any difference in the effects being observable; and as at that time (and I am now speaking of a period of 50 or 100 years ago) druggists were very ignorant upon these subjects, and judged of their calamine principally by its appearance, (as I have admitted, many, if not most, drugs are still judged of by a large number of druggists,) if a powder were produced which had the external character of calamine, and it were put into the hands of a druggist, he would use it; and if nothing in its use led to a suspicion that it was not the right thing, he might go on using it for half a century without its being discovered. Those who collect the calamine have another application of it. Besides its use in medicine, it is used for making brass. Now, nothing could be substituted for calamine in making

making brass, without being found out. If sulphate of baryta were put into copper instead of calamine it would not produce brass; but if sulphate of baryta were put into Turner's cerate in the place of calamine, it might not be detected. Sulphate of baryta is dug out together with calamine; they both come out together; and practically it is the fact that years and years ago it became the practice of those who got the calamine up to separate the sulphate of baryta from the calamine, and to sell the true calamine for making brass, and to send up the sulphate of baryta coloured with a little oxide of iron and to sell it to druggists for true calamine; and the calamine which has been in commerce for years has consisted of such a mixture.

1830. Mr. *Moffatt.*] You say that sulphate of baryta may be used instead of calamine for 50 years without the substitution being discovered; is it used injuriously in that case?—No. I may mention Armenian bole, which has been so frequently referred to for colouring anchovies; there is no such thing as true Armenian bole in this country, and has not been for a century. It is an entirely fabricated article. It was originally a red earth which came from Armenia, as its name indicates; what is now sold as such is chalk and pipe clay, mixed with a little oxide of iron.

1831. Mr. *Swift.*] It is known under the name of Armenian bole?—Yes; many persons may not know that Armenian bole is a manufactured article, but it is quite harmless.

1832. *Chairman.*] Swallowing pipe clay is about as harmless as swallowing Armenian bole?—Yes. The next substance I wish to refer to as a conventional adulteration among drugs is milk of sulphur. I wish in one respect to correct the evidence which I gave on the last occasion. Milk of sulphur has frequently been referred to as evidence of the great adulteration of drugs. Much of the milk of sulphur which is met with in commerce is found to contain a large quantity of sulphate of lime. I wish to give the origin of this. Milk of sulphur was ordered by the College of Physicians of London, in their Pharmacopœia of 1721, to be made by boiling sulphur and lime together with water, and adding to the solution spirit of vitriol. Spirit of vitriol is dilute sulphuric acid; that was ordered under the title of lac sulphuris, and the product obtained by that process is a mixture of sulphur and sulphate of lime; it constitutes the milk of sulphur to which I am now referring; it would contain between 40 and 50 per cent. of its weight of sulphate of lime. I have carefully looked through the Pharmacopœias and other authorities, and that is the only authoritative process I can find which has been given for the preparation of milk of sulphur. I cannot find any other process described for the preparation of lac sulphuris. In a subsequent Pharmacopœia the college altered the name to sulphur precipitatum and they altered the process, and by that altered process a product was obtained which contained no sulphate of lime. The public having for a long series of years used the milk of sulphur prepared by the first of those processes, which was given by the College of Physicians of London, have become so accustomed to it that many of them will not use any other preparation of sulphur than that. There is this difference between the two, that the milk of sulphur which contains sulphate of lime mixes readily with water; it forms a sort of lactescent mixture, which the public are accustomed to, and they require it, and the dealer supplies them with it; it is a conventionality, therefore, between the dealer in drugs and the public. Another case of conventional adulteration in articles used in medicine is the case of oxide of zinc. I have myself taken a great deal of pains to try to disabuse the public mind upon the subject, and to prevent one substance being used in place of another. The oxide of zinc, as it is ordered by the College of Physicians at the present day, is a pure product; but as it was ordered by the College of Physicians in 1824, it was not a pure product. That which they ordered in 1824 was a perfectly white smooth powder, of which I have a specimen (*producing the same*). The public became accustomed to the use of that as oxide of zinc. In 1836 the College of Physicians changed the process, and they substituted a process which gave the pure product; the other is not pure; it contains 30 or 40 per cent. of foreign matter. This pure product, however, differs from that which was previously in use, inasmuch as it is not white. Now the public in the first instance refused to receive the second product as oxide of zinc; they had been accustomed to a white powder, and they continued to use it, and it is a long time before we can disabuse the public mind upon such a subject.

1833. Mr. *Gregson.*] When you speak of the public, do you speak of chemists

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and druggists?—I speak principally of the chemist and druggist, who is accustomed to use this in ointments; and it is among the class of the less-informed chemists that the practice continues to prevail of using the white article; they have been accustomed to judge of oxide of zinc by its external character, and when oxide of zinc is sent to them which is not white, they return it as not being that which it ought to be: there are also some medical men who still continue to use the white oxide of zinc, and reject the purer article prepared by the more recent process of the Pharmacopœia.

1834. Viscount *Goderich.*] Does the same interpretation of the word "public" apply to what you said about milk of sulphur?—No, it does not apply at all to chemists and druggists there, but to the consumer.

1835. Mr. *Swift.*] Who is the consumer?—Those families which use it; there are some families which never allow a spring to pass over without administering milk of sulphur to the children of the family.

1836. Mr. *Kinnaird.*] You do not appear to speak with great respect in favour of this popular prejudice of administering milk of sulphur?—No, it is a prejudice, and one which ought to be removed. There is one other case, and only one other, which I wish to refer to, and that is with a view of correcting what I conceive might otherwise be a misapprehension on the part of the Committee. Reference has been made by the gentlemen who have given evidence to adulterations in the article of gin; it has been represented as being adulterated, and articles have been specified as used for the purpose, namely, oil of vitriol, oil of almonds, salt of tartar, and alum; I merely wish that there should be no misapprehension on the subject. Those articles are used by those who deal in gin; they are used much in the same way as isinglass is used by those who deal in beer.

1837. Mr. *Villiers.*] Are you speaking of the publican or the distiller?—I am speaking of the publican. It has become the practice among those who retail gin to make the retail price to the public very nearly that of the wholesale dealers to him; that is to say, the public are supplied with gin retail nominally at the same, or almost the same, price that the distiller supplies it at to the publican. The publican makes his profit by reducing the strength of the spirit after it comes into his possession; that is to say, he receives the gin from the distiller of a greater strength than he supplies it to the public, or than the public requires to have it. He mixes a certain amount of water with the gin. In the first place, I beg to state that I have, during a recent investigation I had to make for the Board of Excise, had frequent communications with the distillers, and I have been in communication with some distillers upon this subject since this Committee has been sitting. I beg to state that, in the manufacture of gin, certain substances, as for instance, juniper berries and coriander seeds, are always used. Gin is, in point of fact, a pure flavoured spirit, which is unexceptionable in its quality. This gin is supplied to the publican at a greater strength than that at which it is supplied by him to the public. When it comes into the publican's hands it is mixed with a certain amount of water, and it is in that way that he makes his profit. The public is not damaged by this, because it comes to just the same thing as if it were diluted by the distiller before it came to the publican. If the public were supplied with gin in its stronger state they must pay a higher price.

1838. Mr. *Villiers.*] Or consume less?—Or consume less. In the state in which it is now supplied to them it is just suitable to their tastes.

1839. They are so accustomed to it in this mixed state that they would hardly know it if it were pure?—I do not consider that the gin is deteriorated. Water is added, and sometimes a little sugar, but principally it is water. The effect of diluting it with water is to destroy to a certain extent its transparency. Gin contains certain volatile oils; it is the purest spirit which can be produced in this country distilled with juniper berries, coriander seeds, and some other flavouring materials which are put into the still. When the spirit is diluted with water some of the essential oil is separated, and it becomes a little clouded; and the publican, after diluting it with water, requires to fine it to restore its transparency. He does that by introducing into it salt of tartar and alum. Those are things which when mixed together produce a decomposition. Alumina is precipitated, and this alumina, mixed with the spirit, together with sulphate of potash produced at the same time, which is not soluble in the spirit, falls down through the spirit, and carries with it the oil which had been separated, caused by the dilution with water. This is one of the processes of fining. The gin is in no way deteriorated by it any more than wine is by putting the white of an egg into it to fine it, or

beer

beer by putting isinglass; it is known as a fining material, and it is used for the purpose.

1840. Viscount *Goderich.*] If the publican did not put in the water he would not want to put in the alum?—That I admit to be an absurd practice. There are many practices of that description. I believe it is in the same way the publican frequently dilutes his beer. He gets his beer from the brewer of a greater strength than he can afford to sell it at the price at which he commonly sells it. There is little or no disparity between the wholesale price of beer and the price at which the publican sells it to the public, but the profit of the publican is obtained by diluting the beer. His motive, perhaps, for conducting his business in that way is that the public may not know what his profits are. The publican does not want the public to know what his profits are, and he prevents that, or he imagines that he prevents it, by carrying on his trade in that way.

1841. Mr. *Villiers.*] Does not he sell more beer in consequence of selling it cheaper?—I apprehend he sells it at a fair profit.

1842. You say that he sells it at a price from which he could not otherwise obtain a profit; he sells it retail at nearly the same price he pays for it to the brewer; does not he adulterate it in order that he may sell it at a low price, and by so doing sell more of it, and thereby obtain a profit?—Yes; but practically, if he did not dilute it in that way, the brewer would have to do so; he must supply the publican with beer that he could afford to sell at the price which the public expects to get it at.

1843. You have attributed this practice to the fancy of the public. The Committee want to know if there is not something more than fancy in it, and whether it is not a profitable thing for the publican to adulterate those beverages?—In one sense, certainly, it is.

1844. He sells more in consequence of selling cheaper. If he wants to transfer his licence, or part with his business, is not there inquiry as to the amount of consumption in his house?—No doubt of it.

1845. If he sells more, it is an advantage to him?—Yes.

1846. And he sells more because he adulterates?—If he did not adulterate he would get an article which would be previously diluted to the strength at which he could sell it at that price.

1847. What is the objection to selling the pure article?—The only objection is this; the public would have a better means of knowing what the dealer's profit was. The public can go to the brewer and get a barrel of beer, and the publican does the same thing. If the public bought from the brewer the same thing that the publican sold, the public knowing they pay so much for a barrel of beer, on sending to the publican for it, and paying so much more, would know what the publican's profit was; but the publican deprives the public of the means of knowing that by altering the quality of the beer. He is partly the brewer, in point of fact.

1848. Do you mean that every one who goes to a public-house goes there because it would not be cheaper for him to have a barrel of beer at home?—I believe that is the origin of the practice, and I can trace it in other businesses.

1849. Viscount *Ebrington.*] Do you approve of the practice of mixing milk with water, instead of letting people mix it in their own houses if they please?—I do not approve of mixing water with milk at all; I conceive there is a very wide difference between the two cases.

1850. Mr. *Kinnaird.*] You said the public were not damaged by this spirit being sold as gin; do not you know that certain things are added in order artificially to reproduce the strength which is lost by the dilution?—Yes, they are; and inasmuch as that is done, the public are damaged.

1851. Is not cocculus indicus very much used for that purpose?—I do not think it is very much used; because there is not much cocculus indicus used in the country at all; it has been, and is still occasionally, used to a certain extent.

1852. Mr. *Swift.*] Is not there a larger quantity of cocculus indicus imported now than there was some years ago?—I am not aware of that; it may be so.

1853. Do you know that the price has considerably advanced?—Yes.

1854. It has nearly quadrupled, I believe?—I am not aware.

1855. Viscount *Goderich.*] You are of opinion that the publican resorts to this course of proceeding for the purpose of gaining an advantage to himself, are you not?—Yes; he conceives it to be an advantage to keep the public in ignorance of the profits of his business.

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1856. Why do you suppose that he entertains that opinion?—I can account for the practice in no other way. It appears to be a very obvious motive on the part of a tradesman. Every tradesman endeavours to do the same thing. The public is always trying to cheapen the price of these articles, and it prevents that kind of ruinous competition which otherwise would take place.

1857. Mr. *Villiers.*] Do you know anything of the terms which exist usually between the publican and the brewer?—No, I do not.

1858. You do not know that it is sometimes mentioned as a reason for adulteration, that very hard terms are made by the brewer with the publican; that the publican is obliged to take a certain quantity of beer from the brewer at a certain price, and, as he can hardly make the two ends meet by doing so, he adulterates his beer?—I am not aware of that.

1859. I presume your experience only enables you to state the fact that beer and gin are adulterated?—That is so. I wish it should be understood what the effects of this particular adulteration are. With reference to gin, I can speak of it from my own knowledge.

1860. Mr. *Moffatt.*] Is the adulteration you have described as common in gin prejudicial to the public health, in your opinion?—Not at all.

1861. Is not it rather beneficial to the public health that they should not have too strong a spirit supplied to them?—I should suppose so.

1862. You have been asked why publicans object to their profits being known. Do you, within your very extensive experience, know of any class of traders who desire their profits to be known?—No; I should say that all traders desire to keep their customers in ignorance of their real profits.

1863. Do merchants desire their profits to be known?—Certainly not.

1864. Consequently the publicans are by no means singular, but they follow the general rule of trade and commerce in wishing that their profits should not be known?—Certainly.

1865. Mr. *Villiers.*] Therefore that does not account for the adulteration?—I do not see that that follows.

1866. It is not peculiar to them you say?—No; in other cases it is not necessary to resort to the same means of keeping the public in ignorance. Here the peculiar circumstances and relations between the public, the publican, and the large producer, renders this almost the only means of keeping the public in ignorance.

1867. Viscount *Goderich.*] You admit that the means resorted to by the publicans for concealing their profits are not the ordinary means resorted to by wholesale and retail dealers, merchants and other persons in trade, for the purpose of concealing their profit, which is keeping the fact to themselves?—The circumstances of the cases are wholly different.

1868. And the practice is different?—Certainly.

1869. Mr. *Swift.*] Has not the publican another motive in getting a large sale for his beer or his gin, by the low price at which he sells it, namely, that when he parts with his house, or sells the lease of his house, he gets a larger sum as goodwill for it, in consequence of his drawing so many extra barrels of beer, or so many extra gallons of gin?—I do not conceive that the retail price is practically reduced by that means, because, if the publican did not bring his gin down to the strength at which it is now commonly sold, the distillers would do so.

1870. Mr. *Villiers.*] Do you say that from anything you know of the trade; why is it necessary that the distillers should adulterate if the publican does not?—In the first place I do not admit it to be an adulteration; the gin is produced of that strength which best suits the public taste; the public have been accustomed for a series of years to drinking spirits of a certain strength; they have got into that habit, and they require spirit of a certain strength: I conceive that what is sold by the publican is just of the strength which best suits the public taste; and if the publican did not bring it to that condition the distiller would do so.

1871. The people like somebody to mix water with their spirits for them?—They like some one to prepare the beverage in the way best suited to their taste.

1872. Mr. *Gregson.*] Did not you say that the distiller always sells a pure spirit to the dealer?—Yes, so far that there is nothing prejudicial in it.

1873. It is of a uniform strength?—Yes, it is generally of a uniform strength.

1874. Then, what is sold to the public under the name which we see written up, "Hodges creaming gin," for instance, is a mixture?—Yes.

1875. And that is not prejudicial, you say?—I do not consider that it is so.

1876. *Chairman.*]

1876. *Chairman.*] I purchase the gin I consume from the distiller; is the article I get from the distiller the same article he supplies to the publican?—I apprehend it is.

1877. Then he adulterates it, you think, in the same way as the publican does?—No; I apprehend what you buy from the distiller is stronger than what you would buy from the publican.

1878. My taste is better pleased by what I buy from the distiller?—Each party prepares it to suit the taste of his particular customer; the public, who are accustomed to go to the publican only, have got into the habit of drinking gin of a particular strength, and that is supplied to them.

1879. Mr. *Swift.*] Have you ever heard of a person known in the trade as a "publican's adulterator"?—Yes.

1880. That is a person who instructs licensed victuallers who are verdant in their trade as to the way of mixing their cordials and their gin?—In almost every trade there is assumed, or actually existing, a certain amount of art and mystery; it is so in the trade of a publican; the publican conceives that he knows a great deal connected with his business beyond what the public does; he has certain secret methods of improving the quality of his goods upon which he prides himself; some of those are of little or no value, some of them may be hurtful, some of them may have for their object to enable him to get a larger profit; the class of persons now referred to are a class of quacks, who go round pretending to instruct the publican, giving a certain amount of good information mixed up with a great deal of nonsense, to a certain class of persons, and inducing them to believe that they become, by possessing this knowledge, enabled to carry out their business to better advantage.

1881. Mr. *Gregson.*] Is not there a class of persons between the distiller and the dealer, called rectifiers?—Not in reference to spirits of this description; gin is always produced by the man who is generally known as a rectifier; it is not produced by the great distillers, that is, not by the man who produces the spirit in the first instance; the spirit goes from the distiller to the rectifier; the rectifier purifies the spirit, and flavours it with the substances I have mentioned, for the publican, and he also sells pure spirit for the use of chemists and druggists, and other persons.

1882. Mr. *Swift.*] Do you doubt that gin, and beer also, are adulterated with various articles pernicious to the public health?—I think that gin is very little adulterated in that way; I think beer is much more largely adulterated, and that substances prejudicial to health are frequently introduced into beer.

1883. Mr. *Villiers.*] Are you speaking from experience?—I am speaking from my own observation, and also from information derived from very extensive distillers, that is, men who deal in this article.

1884. Did you hear the evidence which has been given in this room; one gentleman said, he had not found a single sample of pure beer in the whole town?—I want to know what is the standard of purity; almost all the statements of that description which have been made here are of a vague nature, that is to say, they are given in general terms, and those gentlemen, if they were cross-questioned by persons practically acquainted with the subject, would have their evidence put into a very different form.

1885. Those gentlemen say they found water present in a very large amount?—Gin consists of more than half water essentially.

1886. Do you consider that your experience is as extensive as that of some other gentlemen who have given evidence here, who have said, that they never found one instance in which articles were not present in the liquor besides what was professed to be sold?—I did not hear it stated, that from extensive observation those gentlemen had found that there were substances constantly present which were prejudicial; if they include among the impurities water, added to gin, I admit it; if they consider that the use of this substance (*referring to the mixture of salt of tartar and alum*) for fining gin is an additional impurity, I admit it is used; and so of the oil of vitriol, which is added for a specific purpose; but you will have a very erroneous notion of the evil resulting from it, if you take only those general statements.

1887. We are now speaking of extent of experience; you say you think gin is rarely adulterated, at least not so extensively as beer; those gentlemen differ from you in that particular; it is not a question as to whether the ingredients are prejudicial, but as to the fact itself, whether that which is called porter is porter,

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and that which is called gin is gin; it is clear, I suppose, that if a man put a label upon two articles in his window, "porter mixed with water" and "porter pure," persons generally would prefer the porter which was pure, and not that mixed with water?—Yes; and yet both would contain water, of course.

1888. Not that admixture of water of which we have been speaking?—Only water is one of the constituents of the article.

1889. There is no doubt, is there, that there is a deception practised upon the consumer, when water is put into the gin or beer, and he believes it is pure?—I do not admit that it is a deception.

1890. Do you believe that the consumers generally know the fact, and prefer the porter and water, and not the porter pure?—No; nor is it necessary that they should know it.

1891. Mr. *Kinnaird.*] You have just admitted that after the publican has adulterated the gin, or weakened it with water, he then has to reproduce strength by the admixture of the materials which have been mentioned; surely the consumer is injured by such a process as that?—I do not admit that he is injured; if anything were put in which was injurious, he would be injured; but I do not consider that there is a practical deception in the case, because the article which is sold at last is an article which is sold at a fair price. There is no exorbitant price which is demanded for it; the public, therefore, are not in any way injured.

1892. If I in buying a horse look in his mouth, and am satisfied that the teeth are as I expected, but I find afterwards that there have been false teeth inserted, I am not injured, you think, because there are the teeth?—I do not admit that that is a parallel case.

1893. Mr. *Moffatt.*] The general answer you desire to give to all these questions, which are put to you with considerable perseverance, is, that you do not believe that the great bulk of the adulterations of gin and porter are prejudicial to the public health?—I have already said that in the adulteration of beer, I believe the substances used are more prejudicial than those which are added to gin. The substances which I am now speaking of, which are added to gin, are added for a specific purpose. The public is by no means injured; the public health does not in the slightest degree suffer.

1894. None of those substances which are added to gin are injurious to the public health?—No; there may be other substances occasionally added, but I wish to remove a prejudice as to the substances I have named.

1895. Therefore it is purely a question between buyer and seller as regards the quality of the goods which are purchased?—Yes; if you buy wine it professes to be the fermented juice of the grape, but if a man in preparing wine finds that he can improve it by putting in a certain seed which improves the flavour, he produces a better article, and if it is not injurious to health, no one suffers from such a practice.

1896. Mr. *Kinnaird.*] If he puts in water first to reduce the strength, and then, being ashamed of the reduction, he puts in another impure article artificially to reproduce the strength he has taken away, you still maintain that the public is not damnified?—That is my opinion.

1897. Mr. *Moffatt.*] Provided the article is not prejudicial to health?—Yes.

1898. Viscount *Goderich.*] You said that the introduction of water into gin was for the purpose of bringing the gin into such a state as to be agreeable to the public taste?—Yes.

1899. How is that consistent with the answer you have just given to the question put by the Honourable Member for Perth, in which you say that after gin has been weakened by water its strength is again artificially raised by the introduction of other substances?—You must first of all understand what this introduction of artificial strength, or the appearance of strength is; it is for that purpose that oil of almonds and oil of vitriol is used; it is used under the denomination of beading. It certainly sounds somewhat alarming to be told that oil of vitriol is always or generally added to gin.

1900. Do you think, as a matter of fact, that it is always or generally added to gin?—I believe it is: I have here some of the mixture which is practically added, in the state in which it is used; the addition is made in this way: one drachm of oil of vitriol and an equal quantity of oil of sweet almonds are triturated together in a mortar, and subsequently mixed with some strong spirit, and here is the mixture when it has been so made (*producing the same*); this is called beading. It is added to 100 gallons of gin, and when so added there will be one drop of oil of vitriol

vitriol to each gallon of gin. I conceive that the quantity is so small that it would be entirely inappreciable, and would have no effect upon the health of the party drinking it: the object of it is to produce a particular character in the beading of the spirit. The spirit when shaken has a briskness or beading, which it would not have to the same extent without this. It is mixed up with the gin with the original object of the publican, namely, to keep the public in ignorance of the profits of his trade; he gets the gin stronger than in the state in which it is sold, and he obtains his profit by adding a certain amount of water to it; but he probably may reason in this way, that if the public were to send to the distiller for the same gin which is sent to him, they would pay about the same price at both places, and on drinking it they would not readily detect the difference, but possibly, by observing a difference in the beading, they might see that the one had a greater briskness than the other, and he produces that increased briskness in this way. I conceive he does in that respect precisely what traders commonly and habitually do, namely, he gives the best external character he can to his article, and makes it pass for as good an article as possible.

1901. Do I misrepresent you when I say that the object of adding this beading to the spirit is to produce the same appearance in the spirit mixed with water which was possessed by the pure spirit before the water was put into it?—No doubt that is the case.

1902. Viscount *Ebrington.*] The public is not injured, but is deceived, according to your opinion?—The public is in that respect deceived, but not injured, because the public gets it at the price which the public would pay for it under any circumstances.

1903. The public gets one thing, and thinks it is getting another?—I think the public are not acquainted with any of the circumstances of the case; they do not inquire into it in point of fact.

1904. Mr. *Moffatt.*] They know nothing as to the manufacture of gin, but if they get what they usually receive as gin, they are well content?—Certainly.

1905. The term "gin," I presume, is in itself a mere conventional term, and it may apply equally to the mixture you have described as to the spirit sent out from the distillers?—Yes.

1906. And the word "gin" is more generally understood to represent the article which you have last described?—Yes.

1907. Viscount *Goderich.*] By whom is it so understood to represent the article you have last described?—By the publican.

1908. Mr. *Villiers.*] Do you think the disclosures which are taking place will have any effect in discountenancing these mixtures which the public have been accustomed to drink, and do you think we shall see advertisements of unadulterated gin?—I dare say you may, but I do not think that they will be any less adulterated.

1909. Viscount *Ebrington.*] Do you believe that the quantity of beading you have described is never exceeded by publicans?—I am assured by those who are accustomed to use it, and also to supply it, that that is the regular quantity; it may be slightly exceeded sometimes, but it could not be exceeded with any advantage to any appreciable extent.

1910. In those proportions, you say oil of vitriol would produce no appreciable effect upon the human frame?—Certainly not.

1911. You are aware that it is given in medicine?—Yes.

1912. But the doses are much stronger than that?—Yes; as it is mixed with gin it amounts to only one drop to 70,000.

1913. Viscount *Goderich.*] Do you think that any substances are added to the gin and water which is sold by retailers for the purpose of giving an impression, in regard to the taste, of its being stronger than it really is; this process of beading, I understand you, is for the purpose of improving the external character of the gin?—I believe if such practices be adopted, they are quite exceptional.

1914. Have you ever heard of Cayenne pepper being used?—I have.

1915. What is the purpose of adding Cayenne pepper?—It is to give an appearance of strength by the effect upon the palate, but I believe that the use of such substances is extremely rare, and gin really is a substance which does not admit of being tampered with, and it is not tampered with; but the public get it in the state of a perfectly wholesome beverage.

1916. Nothing you think is added to it, to make it appear to the palate to be stronger than it really is?—As a general rule, such substances are not used.

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917. Do you consider when they are used that it is a fraud?—Decidedly, I should consider it to be objectionable.

1918. Mr. *Villiers.*] Have you ever met with sulphate of iron in porter?—Yes.

1919. Is it healthy?—I do not think in the quantity in which it is used it is decidedly prejudicial to health; I think it is an objectionable practice to introduce it.

1920. Did you ever hear of a case in which a person was poisoned by it?—Never.

1921. Did you hear the case mentioned by Dr. Normandy, in which very serious and even fatal consequences had resulted from the use of it?—That must be a very extreme case.

1922. Mr. *Moffat.*] In what proportion is sulphate of iron usually introduced into porter?—I am not able to state the proportions, though I have frequently known it to be used.

1923. Mr. *Villiers.*] It gives it a head, does not it?—Yes, and also it gives an appearance of strength to it.

1924. Mr. *Kinnaird.*] Does the publican mix that beading himself, or does he purchase it ready prepared?—He generally purchases it ready prepared.

1925. Is he the person who apportions the proportion of beading to the gallon of gin?—Yes, the publican will come to a man who is supposed to understand how to prepare this, and ask for beading for 100 gallons of gin.

1926. Should not you consider it very dangerous for a man in the position of a publican to undertake to mix such powerful materials together, with a view of adulterating gin, and is not considerable evil likely to arise by his so doing?—There is no great art involved in mixing it; I apprehend he would not undertake it, unless he had been initiated in the practice of doing so; the class of persons referred to just now by an Honourable Member as publicans' adulterators, would be the class who would give the publican instructions in matters of that description; those are the arts and mysteries of the trade.

1927. Viscount *Ebrington.*] Those accounts which have been given at different times of persons being poisoned, or made very ill by spirit being adulterated with cocculus indicus or excessive quantities of vitriol, must be regarded as merely exceptional, and as resulting from a want of skill or care on the part of the publican?—Undoubtedly.

1928. Mr. *Gregson.*] Why do you state that other witnesses have given vague evidence; they have represented to us that they have carefully analysed the articles of which they have spoken?—They speak, for instance, of gin being commonly adulterated, and its being an exception to the rule when it is not so; they do not state what they mean by adulteration; if they mean admixture, I admit it is not only common but universal.

1929. Viscount *Ebrington.*] Do you consider beading to be an adulteration?—I do not consider it so; there is nothing prejudicial in it.

1930. Then the meaning of the word adulteration is not the admixture of things which are foreign to the article sold, but simply the introduction of articles which are prejudicial to health?—Yes, or which will in some way deteriorate the quality of the article.

1931. Does not all admixture of a cheaper article with a dearer article deteriorate the value of the dearer article *pro tanto*?—No; it may make it better adapted to the purpose for which it is intended. Suppose a distiller never sold anything but absolute alcohol, absolute alcohol could not be drunk by the public without their being greatly injured. The publican then would have to dilute it with water, and with such a quantity of water as should render it suitable for a beverage, and the distiller, practically, sells his spirits in a greater strength than the publican requires to have them, and the latter dilutes them to the proper degree.

1932. Does any one profess to sell absolute alcohol?—Not persons of that character.

1933. Mr. *Swift.*] You say, that after the publican gets his gin home, and reduces it by water, the agency of the articles you have now brought before us is used to make it assume the original quality of the gin when he first received it from the distiller?—I have no doubt that is the real object; it is not the ostensible object.

1934. Has it that effect?—It has to a certain extent, with reference to its external character, its appearance to the eye.

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1935. If I send to Hodges and obtain a certain quantity of gin from his house and then get a quantity of Hodges gin from a public-house, would there be any difficulty in discovering the difference between those articles?—Not if you resorted to the means the chemist would resort to.

1936. I mean with respect to the taste and flavour, and pleasurable qualities of the beverage?—In those respects I believe one would be as good as the other.

1937. I should not be able to distinguish the difference?—If you were an adept at it you might be able to distinguish the difference in the strength; you would find that one would bear a greater amount of dilution than the other with water; but, taking them in an undiluted state, you would have some difficulty in distinguishing them by the taste.

1938. Mr. *Moffatt.*] How long has the Pharmaceutical Society been established?—Between 14 and 15 years.

1939. What was the object of its establishment?—The improvement of the state of pharmacy in this country, by extending information among the class of chemists and druggists.

1940. Is the society mainly supported by those who are engaged in the trade of vending drugs?—Entirely so.

1941. Is it very extensively supported?—It consists of between two and three thousand members.

1942. The association comprises nearly all the leading people engaged in vending drugs, does it?—It does, throughout the country.

1943. The object having been to secure a better supply of drugs throughout the country?—Yes.

Alphonse Normandy, M.D., further Examined.

A. Normandy, M.D.

1944. Mr. *Villiers.*] I BELIEVE you made a statement upon your former examination with respect to carbonate of soda?—I did.

1945. You stated that carbonate of soda was very seldom obtained pure?—I did not say it was very seldom obtained pure; I said I had frequently found bicarbonate of soda adulterated with sulphate of soda.

1946. Have you heard the statement made by Mr. Redwood in this room to-day with respect to carbonate of soda?—Yes.

1947. He has referred to you by name as having supplied him with a sample of bicarbonate of soda?—Yes, which contained sulphate of soda.

1948. Was that taken from a particular place which was selected from your being likely to find bad soda there?—From a place which was likely to sell impure bicarbonate of soda.

1949. Do you confirm the statement which Mr. Redwood has made, that bicarbonate of soda is hardly ever in an impure state?—I am not prepared to say so, but if you will permit me, I will relate in a few words what took place. In consequence of Mr. Redwood, a gentleman for whom I profess the greatest esteem and respect, having thrown some doubt as to bicarbonate of soda being seldom impure, I called on a chemist and druggist in my neighbourhood and directed him to give me an ounce of bicarbonate of soda, which he did. When he had done so, I requested him to put his seal on the paper, and his label, so that it could not be tampered with. I then requested him to give me another half-ounce of the same substance, and when he had done so, I told him that I intended to analyse that bicarbonate of soda. He said, "You will find I think that it is pure, because I pay the highest price for it." I said, "Are you aware that bicarbonate of soda is largely adulterated?" He said, "Yes; I have frequently found myself that bicarbonate of soda, instead of being entirely soluble in water, as it should be if pure, has left, on the contrary, a pretty large quantity of insoluble matter, which I take to be sulphate of lime or carbonate of lime. Besides that," he said, "bicarbonate of soda is often offered at a much lower price than I pay; in fact, the price varies from 16 *s.* per cwt. to 56 *s.* per cwt." He showed me a printed list of prices from one of the large manufacturers in London, in which I saw those prices printed, and he said, "I judge from that, of course, that bicarbonate of soda must often be sold in an impure state, from the fact of this great difference in the price." I asked him if he could tell me where I was likely to get an impure bicarbonate of soda. He told me, "If you go into one of the back streets of Somers Town I have no doubt you will find it there." I did so; I went to two shops; I directed at each shop the

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parcels to be treated in the same way; that is to say, one of them to be perfectly sealed and the other open, so that I might analyse it. I found one of those two samples to be pure carbonate of soda, containing only between one and two per cent. of sulphate of soda, which I call pure for all practical purposes; but on examining the second parcel I found in it upwards of 11½ per cent. of sulphate of soda. Being on friendly terms with Mr. Redwood, I called upon him on Saturday morning and asked him, "What would you consider an unwarrantable impurity in bicarbonate of soda; would you consider five per cent. an unwarrantable impurity? He said, "Decidedly." And I answered, "Here is a sample which contains upwards of 11½ per cent.; will you please to break the seal yourself, so that you satisfy yourself that it is perfectly genuine, that is to say, a genuinely bought article; take half of it, analyse it, and re-seal the remainder, in order that my evidence should not be questioned." He did so, as you have heard, and he found, like myself, 12 per cent. of impurity. Now with respect to his having taken a great deal of trouble; I know it is a great trouble to procure samples; it appears that he has within the last two days procured some 40 or 50 samples; and he says all those were perfectly pure. I cannot account for it in any other way, except that I believe there is now a great deal of stir made about the present inquiry, and if any person suspected to require a drug for analysis comes into a shop, the probability is that he will not get an impure drug; I say this, because at the request of one of the Members of The House I called upon one of the largest sellers of chocolate for the purpose of buying a sample of his goods. I have called twice, and I cannot get it; they tell me they do not keep it, or they have no more of that stuff, and so on, wherefore I am inclined to think that they had suspected my object, and determined to defeat it.

Mercurii, 1° die Augusti, 1855.

MEMBERS PRESENT.

Mr. Scholefield.	Mr. Otway.
Viscount Goderich.	Mr. Villiers.
Mr. Wise.	Viscount Ebrington.
Mr. Kinnaird.	Mr. Gregson.

WILLIAM SCHOLEFIELD, Esq., IN THE CHAIR.

Mr. *Thomas Herring*, called in; and Examined.

Mr. *T. Herring*. 1 August 1855.

1950. *Chairman.*] I BELIEVE you are a wholesale Chemist and Druggist?—I am.

1951. You have been in business a good many years?—Above 40 years.

1952. I need not ask you whether you have a very extensive experience, in the article of drugs especially?—During that time, and lately, for the last 20 years, I have had great experience in my way of trade for my own consumption, and from what I have seen besides.

1953. Will you favour the Committee with your view as to the existence of adulteration in the article of drugs?—It exists to a very great extent; and if you will allow me, I will show you what is going on at the present day. Last week, or the week before, we had a sale of a most important article, scammony.

1954. Do you mean a public sale?—Yes, at Garraway's Coffee-house. Brokers are employed by merchants to sell these articles.

1955. Where does scammony come from?—Principally from Aleppo, Smyrna, and those parts. It is one of the most important drugs we have. As an article of commerce, the scammony which we consider ought to be used will cost us 40*s.* a pound; but here is a piece I hold in my hand which will show the Committee what is sold very often for that article. The true article is called Virgin Scammony, and I have been compelled to give 40*s.* a pound for it. The law allows

allows anything to be imported, and that which I have before me was imported in the last month, and was sold at a public sale for 3*s.* a pound.

1956. What is the nature of that compound which is called scammony?—This article contains not one atom of scammony; not a trace of it. It is all gum and a mixture of various kinds; but still it is imported as scammony, paying no duty, and in it comes.

1957. Is there a large demand for that spurious article?—A very great demand; 10 times or 20 times as much as for the other. If it were not used parties would not keep it; but it is used no doubt to a very great extent.

1958. Mr. *Wise.*] If it pay no duty, under what name is it entered?—As scammony.

1959. Does not scammony pay duty?—No.

1960. *Chairman.*] Is that impure article an artificial compound?—I have not a doubt of it; made for the purpose of deceiving the public. To show the Committee how difficult it is to get a pure article, I may state that a great quantity comes with one-third and one-fourth adulteration; and I have lately examined four parcels of scammony, one of which was imported by ourselves, and the others by different merchants, and some of them contained but a small portion of scammony.

1961. All of them were adulterated?—Yes; we ascertained that in one parcel, which was an exceedingly good one, out of 100 parts of the article there were 70 parts of scammony, 24 parts of insoluble matter, and six of water; that we call an excellent article.

1962. What were the proportions in the other three parcels?—One had 58 parts of scammony, 36 parts of insoluble matter, and six parts of water; and we descended at last to one containing 42 per cent. of scammony, insoluble matter 50, and water 8.

1963. Mr. *Villiers.*] Who imports this compounded article?—It is imported by the merchants themselves; we have some which is imported not in this shape, but which will contain from 80 to 90 per cent. of chalk.

1964. That again is artificially compounded?—It is; it is all done abroad; we analyse it, and get out the chalk and dirt, and see what scammony there is. This is one of the most important drugs which we have, and still more so when you know that it enters into the compound extract which every medical man in ordinary practice is continually prescribing every day. When he is prescribing pills which are made from that compound article he is doing more mischief than good, because instead of acting as an aperient it is acting quite as an astringent; a man is taking a quantity of chalk, and in many instances the bowels have been bound up, and it has been found to be occasioned by the medicine which has been taken.

1965. *Chairman.*] Have you any other article to remark on?—It was stated in some of the evidence which has been given before the Committee, that opium was imported 19 times out of 20 adulterated. It always comes adulterated; it cannot come otherwise, it is a compound of the juice of the poppy mixed with other leaves to make it adhere together, and very often a great deal of dirt. Sometimes it comes so much adulterated that no man of any experience will say it ought to be used at all, and I have now a piece in my hand which was sold last week at about 4 *s.* a lb., when I should be glad to give 20 *s.* for common good opium.

1966. Have you analysed that?—I will not say that I have done it; I know it has been done; the broker who gave it me had it analysed, and there is not a grain of morphia to be detected in it.

1967. Mr. *Wise.*] If I understand rightly, opium in its pure state could not be formed into a cake; it requires to be mixed with some other articles?—Yes, being a poppy juice they put it together with dirt to get it into a ball; the same remark applies to scammony; that is collected from the juice of a plant, and they put plates underneath the plant, strewed with a little lime or clay, so that when the plate is full you can brush it off into the little thing they call a drum; that is the cause of our getting dirt in it.

1968. That is to say, you must always expect a small quantity of extraneous matter, but it is only where the extraneous matter becomes excessive in quantity that you deem the article to be adulterated?—Quite so. I have for the last 20 years studied this question very minutely, and done everything I could with respect to it, upon the principle that I believed no medicine ought to be

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used but what is pure. A man goes to Newgate Market and pronounces certain meat to be bad, and it is at once condemned. That is very important, no doubt, but I think that medicine is still more important to be pure, and the public, wherever they may be, should have what the medical man prescribes.

1969. *Chairman.*] If a patient had a prescription given to him containing laudanum, if it were compounded of that spurious substance you have shown to us it could do him no good, but might do him harm?—It must do him harm.

1970. In some cases it might even lead probably to fatal consequences?—I have no doubt of it.

1971. Mr. *Wise.*] Therefore you think the course pursued by the American authorities is a very proper one with reference to frauds of this kind?—Decidedly; they perhaps carried it too far, and were forced to retract what they did; they would not at one time admit any bark to go into the country, except yellow bark, for making quinine; consequently they lost the whole of the trade in quinine, because quinine is not always made of yellow bark, but of other kinds of bark.

1972. At the same time the American authorities did not admit any drugs to be imported without inspection, and you think that that was a beneficial regulation?—Certainly. There has been a case in America in which a large quantity of blue pill was sent in, which was suspected not to be good. It was analysed, and found to be an improper composition, and it was returned immediately.

1973. Mr. *Villiers.*] Do you know anything about the inspectors who are appointed in the United States in order to prevent the importation of bad drugs?—Only by hearsay; we are shipping a large quantity of blue pill every month to America, and we put our name on it.

1974. Are there officers attached to the Custom House?—They have officers attached to a branch of the Government who have power to say, respecting an impure drug, "That it is not fit for use," and to send it back.

1975. Do you know whether they are only in the outports?—I cannot say correctly, but I should imagine they are only in the outports. It is there that the admission of the drugs must be stopped; when they are once admitted, you can have no control over them.

1976. You only know of their inspecting articles which are imported into the country?—That is all we know.

1977. Where does the opium come from which you have spoken of?—From Aleppo, and Smyrna, and that country; the whole of it comes from there.

1978. Do you mean the whole of this opium which is defective?—It generally comes from Aleppo and Smyrna.

1979. *Chairman.*] Very little comes from the East Indies to this country, we understand?—Very little indeed; they will not allow it to come. It is a fine opium, but we get only samples of it. We have opium sometimes from Constantinople by chance, which is also a fine opium that the medical profession hold in high repute.

1980. Do you ever get any of the East India Company's opium?—Only in small quantities now and then; I have only seen two or three packages of it in the last 40 years.

1981. Mr. *Villiers.*] You are not speaking of your own particular business, but of the trade generally, are you?—I have no doubt I should have known of it if there had been more, because I have been seeking after it, and should have been glad to get it.

1982. Do you import drugs yourself?—We import many drugs and essences, such as bergamot, and manna, and cream of tartar from Trieste; but opium is only imported by a few merchants in London, who are called Turkey merchants. They employ a broker. We go to our broker, Mr. Brooks, when we want opium; and as a great portion of the opium passes through his hands, he selects the best and finest he can.

1983. How do you know it is imported impure, if you do not import yourself, but take it from the merchant who does?—When we buy opium, we go to the docks to look at it in bond; it pays 1*s.* a lb. duty. We may say, "We do not like that chest at all," and reject it. There is a great deal of what is called ball opium.

1984. You

1984. You are allowed to make experiments, are you, to ascertain the quality of the drugs in the docks?—Whenever we buy large quantities, we are. In the case of bark, for instance, they will allow us to draw a sample, to analyse and examine before we buy.

1985. Have you any other check, in fact, than that of individual vigilance?—None.

1986. I suppose it is only in peculiar cases that any purchaser is allowed to make this examination?—They would not do it for people who wanted merely a chest or a small quantity; but if it is a large purchase, it is their duty and their interest to forward our views.

1987. Are the Committee to understand that this inspector in the United States is a public officer who examines drugs, not with a view to the revenue, but for the protection of the community?—Entirely; to prevent the importation of sophisticated articles.

1988. Is it your opinion that we could have any better check upon the importation of bad drugs than some system of inspection like that?—I have been turning over in my mind how we could stop it, and I am convinced the only way would be for an efficient man to be appointed for the purpose; he ought to be a chemist as well as a druggist; what I should call a pharmaceutical chemist. He ought to be paid so liberally that he would not have to employ himself in anything else. And I think he ought to have power to go to the shop of any chemist and druggist, and say, "Show me your scammony;" and he ought also to be able to go to medical men, for they are the persons who get the most inferior drugs.

1989. To prevent the importation of bad drugs, you would have an inspector at the different ports, who should examine all those articles as they arrive?—I do not know whether it would be easy to carry that out. I could show you a fine chest of opium, and you could only tell its quality by manipulation, such as the druggist has to purchase.

1990. Would not it be an advantage to the trade generally if there were some preliminary inspection of this kind of drugs which are imported; I suppose many retail chemists may be imposed upon by the merchants?—No; the chemical young men, even the chemists and druggists of the present day, ever since 1841, are an extremely improved body, in point of intelligence and education. I dare not send an article which has been sophisticated to any chemist of high standing; it would be an insult upon his judgment.

1991. Therefore they must know when they sell inferior drugs perfectly well?—No doubt of it.

1992. Do you suppose there is any such commerce carried on as that of selling inferior drugs, that they may be retailed again?—When once they get into the hands of the trade, there are some persons who will sell inferior articles. According to my idea, the best way to stop it would be to have a man appointed of science and talent, with a liberal salary, who should have power to walk into any place and inspect drugs; and if they are so bad as ought not to be compounded, the name of the dealer ought to be handed up to the Government.

1993. The very existence of such officers to whom such things might be referred, would have a powerful influence upon the trade, would not it?—A man would say to himself, "The Government are going to take such active measures, I will not have any of these things for fear of my character;" that would be the means to correct it.

1994. You believe it would have an instant effect?—An instant effect.

1995. Do you believe that the mischief is so serious and extensive as to require such an interference as this?—Yes, I do.

1996. Do you believe the practice to be very pernicious?—I am sure it is. Those articles ought never to be compounded at all, because they do mischief.

1997. Have you heard some of the evidence which has been given here to the effect that there is a positive demand for inferior articles, and that it would be dangerous and even injurious to people to produce the pure article?—I do not think there is any difficulty in getting a good article.

1998. Such evidence has been given, that either from custom or preference, the impure article has a greater sale in the market than the pure?—No doubt it has, for one very good reason; because it affords the person selling it a larger profit.

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1999. That is not any advantage to the consumer, is it?—Certainly not; it is an injury to him.

2000. You are not aware of any preference of this kind for impure drugs, are you?—I am not. As I said before, I think chemists and druggists within the last 10 years have been very much improved, and particularly those from the Pharmaceutical Society. I have been a member of the council since 1841, and I can state that our whole object is, when we get hold of any bad drugs to expose them directly.

2001. It is the opinion of a gentleman connected with that society, who has given evidence, that there is very little impurity in those drugs, and what there is is not at all injurious?—I cannot agree with that.

2002. I suppose from your opinion, that this is extensively done, you think there are some chemists and druggists who are not so scrupulous as they ought to be?—There is no doubt of it; there are some who will buy common drugs, but as a body of men I am not aware of any who stand higher. There is scarcely a great city in the kingdom with which I have not connexion, and I must say that no men are setting their faces more against everything of the kind than they are; whether you go to Brighton, or to Edinburgh, or Liverpool, it is the case.

2003. How do you reconcile this view of the greatly improved moral as well as intellectual character of chemists with the very extensive system of adulteration which goes on, and which, I suppose, is for their own benefit?—There is no doubt there are a great many bad things sold. There always will be men not of that high character that they should be; they get a larger profit by selling a common article, and so they do it. I think myself that to prevent such articles being sold would be beneficial; and if it were held out that the Government would appoint a person who had power to examine the doings in any place, that would be effectual to check it.

2004. You do not think that the respectable portion of the profession would object to that?—I think they would be delighted with it.

2005. With respect to bicarbonate of soda, it has been stated here that it is hardly ever impure?—Hardly ever pure, you mean.

2006. In connexion with the Pharmaceutical Society, we have had an opinion that bicarbonate of soda is hardly ever impure?—It used to be the case, when bicarbonate of soda was worth about 8 *l.* the cwt. Now it is only worth 15 *s.* a cwt., and there is no inducement, therefore, to adulterate the article in the factory; it is not worth adulterating at all.

2007. What is the reason of the difference in the price of carbonate of soda, which every person must be aware of. You will find an ounce charged respectively at different shops 1 *d.*, 2 *d.*, and 3 *d.*?—It is the whiteness and the pureness of the article and its solubility, which renders it a good article; the price will depend upon the style in which the thing is put up. If you go to the West end, or to the respectable parts of the City, you would get it put up in a clean and respectable way. If you go into any of the poor and low neighbourhoods, it will be weighed in a dirty scale, and put up in a discoloured piece of paper, and when you get home you will be inclined to throw it into the dust-hole.

2008. Chemists and druggists now very often give advice, do not they?—No; they set their face against it.

2009. I thought it was the other branches of the profession that set their faces against it?—No; if a man came into a druggist's shop, who had cut his finger by falling down upon the pavement, the druggist would take out the piece of glass, and put a piece of strapping upon it; but if a man came for advice in a case of fever or otherwise, he would not receive it from a druggist, because they are not equal to giving it. There are instances of some of our retail druggists being apothecaries; for instance, Mr. Savory; he was originally brought up as an apothecary, consequently he would be qualified to prescribe; but if you went to Mr. Jacob Bell, he would not give advice, because it would be going out of his line.

2010. One medical man has stated that the proportion of the different drugs sent to St. Thomas's Hospital which were impure was nearly one-third; does that, with your experience, astonish you?—Mine is mere hearsay, I cannot give evidence upon it; but this I will say, all institutions and all public bodies ought never to contract for drugs at a certain price; they ought to give what is fair

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and proper for the article, and have what they order, which is not a very common case.

2011. *Chairman.*] Have you any experience in the supply of drugs to Poor-law Boards?—We never did it; but I have seen a great deal of it, and there the powdered article will be 100 per cent. cheaper than the staple article. Take a piece of rhubarb; it shall be 8*s.* a lb., and the powder shall be 4*s.* If you were to go into a grocer's and ask for a pound of pepper, and being served with whole pepper, were to say, "I made a mistake, I want the powdered pepper," and were to buy the powdered pepper at half the price of the whole pepper, your wives, I fancy, would be very apt to ask you, "Where did you get it?"

2012. Mr. *Villiers.*] I take for granted there is a little mixture of something else in the powder?—I leave you to infer what the fact must be.

2013. *Chairman.*] You have no doubt that Poor-law unions are imposed on to a very great extent in the drugs which are supplied to them?—I have had myself only one opinion upon it.

2014. Mr *Villiers.*] Do you consider that a system of inspection would be a great benefit to all classes of the community, and among others, to the poor?—No doubt of it. Why should Apothecaries' Hall get such an enormous price for their articles? Simply because they really supply what they are asked for, and they say, "We must be paid for doing so."

2015. There is no economy in using bad drugs, is there?—Quite the reverse.

2016. Would not the union save in the long run by buying only good drugs. Would not those who use the drugs be cured sooner?—There can be no doubt about it; you may go and buy a hat at 1*s.* 6*d.*, still it is a hat, though you probably give a guinea for yours.

2017. Mr. *Wise.*] You have mentioned an article to which that observation particularly applies; viz., rhubarb. It has been stated before this Committee that there is a grower at Banbury who sells to wholesale chemists as much as 20 tons of English rhubarb; have you heard whether that is correct or not?—I have no doubt he grows half as much, 10 tons a year; that is sold to druggists there can be no doubt of it, that is worth about 40*s.* a cwt. or 5*d.* a lb., and it has a very pretty colour; it produces an irritation in the bowels, but it does no good.

2018. You said just now that you should approve of an inspector being attached to some department of the Government and having power to go into a shop and say, "Show me your drugs;" do you think that would be sufficient?—Quite so, and as much as you ought to do.

2019. Would a chemist show him any drugs that he knew were impure?—If he refused it, it would be a proof that he was doing what he ought not. It has been stated I understand before this Committee that calomel is adulterated with 50 or 60 per cent. of chalk. Now that could not be; when people adulterate articles they put in something which has the same appearance; that is not the case with chalk and calomel. There are one or two observations upon another subject which I should be glad to make to the Committee. We are ordered to make our compounds according to the Pharmacopœia, but we have three Pharmacopœias; one for Dublin, one for Edinburgh, and one for London. If you have a prescription made up in Edinburgh which contained a solution of morphia, it would be made up in the Edinburgh form; but if you brought that prescription into a London house, and the young man made it up, as he would, according to the London form, you would be taking double the quantity of morphia you ought to take. But prussic acid precisely in the reverse way. If a man is taking prussic acid in Edinburgh, and then comes to London to get his prescription made up, he will be taking only half the dose.

2020. Mr. *Villiers.*] Will you explain why that is?—There are three Pharmacopœias. We are now working with the College of Physicians, and with all the experienced chemists and druggists in London and in the country to form a National Pharmacopœia, and are going through it minutely; it will involve a great deal of labour.

2021. Mr. *Wise.*] Do you mean that if Dr. Bright or Dr. Paris gave me a prescription to-day, and I went to Scotland and was taken ill at Edinburgh, and had it made up there, it might have a very different effect to what my medical adviser intended?—In the case of prussic acid, Edinburgh prussic acid is twice the strength of the London prussic acid. If you were ordered to take five drops and increase it to ten, when you went to Edinburgh you would be taking

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10 drops and 20. Many fatal accidents have occurred in consequence. I will take the liquor morphiæ of London; the article is double the strength of that at Dublin and Edinburgh; therefore, if you had it made up in London, you would be taking a strong dose; and if you went to Dublin, you would be taking only half a dose. Under the Bill which has been prepared chemists and druggists will be compelled to go under examination before they can enter into business. I have seen a young man take foxglove and make a tincture of it, thinking it was henbane; but all those young men will in future have to go under a course of pharmaceutical botany. I am stating this to show the anxiety of chemists and druggists to improve their own body.

2022. Mr. *Villiers.*] Therefore they would not offer any objection to any suggestion for preventing this adulteration?—Certainly not.

2023. Does not cinnamon powder enter into a large number of the preparations of the London, Dublin, and Edinburgh Pharmacopœias?—We have lately had an order from the Government for a large quantity of cinnamon powder; one of the medical men of the Board asked the prices of various things, and he thought them very dear. I said, "Gentlemen, what are the staple articles; if you get it cheaper than our price you must be using cassia instead of cinnamon;" and that is continually done.

2024. Cassia is commonly used, is it, and it is commonly miscalled cinnamon?—No dobut of it.

2025. Do you know that barley or rice flour has often been substituted for true powder of cinnamon?—No, that would be detected.

2026. Is not cinnamon powder often prescribed in cases of diarrhœa, and other such diseases?—Always; it forms a strong ingredient in the aromatics ordered in diarrhœa.

2027. Is not it likely that the prescription of a medical man may be defeated by the impure state of the drug?—Decidedly. If he used cassia instead of cinnamon it would have no effect at all; whereas cinnamon is an astringent, and would have an effect.

2028. That is a very important adulteration then?—No doubt of it; any druggist could detect it.

2029. Is it true that jalap powder is frequently adulterated with raspings of guaiacum?—Yes, formerly; even last week the merchants have been importing an article called jalap tops, which is merely the cuttings of the tree, not the root, and which has been sold at 2 *d.* per lb.; people do not buy it to look at.

2030. *Chairman.*] It has no medicinal property?—Not any at all.

2031. Is the powder of ginger frequently adulterated with barley or rice flour?—I should say never; if they did adulterate it, they would adulterate it with inferior ginger; you may buy ginger from 4 *d.* a pound to 2 *s.*

2032. Mr. *Wise.*] Has your attention ever been directed to a great number of pills and patent medicines which are sold in the Metropolis to the working classes, and are used very largely by them?—I know the composition of most of them; I never paid any particular attention to them.

2033. You do not know whether they are made up of adulterated drugs?—We cannot tell what some of them are made of; whatever they may be, if they were to put powder of post into pills, and advertise them, they would sell no doubt; it all depends upon the advertisement. "No longer pipe, no longer dance." I have known a man pay 4,000 *l.* a year for advertising a composition.

2034. It sold only because it had an attractive advertisement attached to it?—Yes; he had only to leave off the advertisements, and none would be sold. Cases are brought before the public, in which a cough or cold has been said to have been cured at once, which a man has had for 40 years.

2035. *Chairman.*] The Committee has been told by one witness, that chemists and druggists do not analyse their own goods, but judge of them very much by the external appearance, as a butcher does his meat; do you think that an accurate way of proceeding?—No; I should say it would depend upon the house he had it from. I would not boast of my own, but if I were to send an article out, perhaps it would not be examined at all,

2036. You would not consider an examination by the eye sufficient?—Certainly not; but I think druggists are so generally up to the mark now, that it would take a very clever fellow to impose upon them; knowledge has destroyed all power to cheat them in that way.

Peter L. Simmonds, Esq.; called in, and Examined.

2037. *Chairman.*] I THINK you are the author of a work upon The Commercial Products of the Vegetable Kingdom, are you not?—I am. *P. L. Simmonds, Esq.*

2038. In the course of preparing that work, have you had under your consideration the question of adulteration?—I have. 1 August 1855.

2039. Will you favour the Committee with your general opinion as to the state of things in reference to adulteration?—I have paid a good deal of attention to the subject, both as a commercial writer and as being identified with several newspapers. I am the City editor of "The Globe," one of the editors of the "Journal of Commerce," and identified with several journals of that kind, in which it has been my special business to pay attention to commercial products imported and exported. My evidence will therefore bear chiefly upon articles coming here adulterated and exported adulterated. I am not so well informed as to the adulterating ingredients in those which are vended at home; but I can give the Committee some information as to what is the custom in other countries, and what are the practices of adulteration which prevail in some of the places from which the articles are exported. Upon the fiscal question, probably I may be able to show the Committee that the Government loses, in point of revenue, immensely by the practice of adulteration. Perhaps I had better turn to the fiscal question first, and give the Committee the result of a few notes which I have made upon the subject. This is an approximate statement which I have made; of course it is vague and indefinite, but it is deduced from the evidence which has been given by various witnesses as to adulterations, and as to adulterations which, from my own examination, occur in certain articles of general consumption which are subject to fiscal and Customs' revenue. I will take them *seriatim*. First, the substances used in the preparation of dietetic drinks and beverages; coffee, for example. I published, a few years ago, a little work on coffee, which is entitled, "Coffee as it is, and as it ought to be;" in which I particularised the numerous shameful adulterations practised in that article. I have had some experience on that subject, from being a coffee planter myself in the West Indies, and I looked a good deal into the adulterations which were practised. It was about the time the question was publicly discussed and the proceedings adopted which have since checked adulteration of coffee by chicory very materially. Chicory is now subject to a duty, but there was a great deal of home-grown chicory then. I estimated that there were 18 million lbs. used annually of various substances which fraudulently replaced coffee, at 4 *d.* a lb.; that would cause a loss to the revenue of 300,000 *l.* If coffee were used instead of the adulterated article, it would produce that amount. Taking those substances which are used instead of coffee, and for the purpose of adulterating it, and assuming the same amount of coffee to be used, it would yield to the revenue 300,000 *l.*

2040. Mr. *Villiers.*] Those articles not being imported themselves?—No. I will next take the article sugar: I assume there may be about 10 per cent. of adulteration in the case of sugar; flour, sand, and other materials are added to make up the weight. I take it, in all those cases, that so much of the imported article is thrown out of use by the employment of those substituted articles.

2041. Viscount *Goderich.*] Are you aware that the Committee were told yesterday that in certain trades it is the practice of the retail dealer to make his profit by adulterating his goods?—I heard part of the evidence yesterday of Mr. Redwood, and I believe it went to that effect. I differ *in toto* with him in that. I do not believe a purchaser going for one gallon of gin to a distillery would get it at the same price as a publican who obtains a very large quantity. It was argued by Mr. Redwood that the practice was necessary to conceal the publican's profits, inasmuch as the purchaser of a small quantity could obtain it from the distillery at the same price as a large quantity.

2042. Consequently you think it fair to assume that the revenue loses the balance between the amount of sugar used and that which would be used but for the adulterations?—I think so. With respect to raw sugar, I assume that there is 10 per cent. of adulteration on the consumption of last year, which was 8,000,000 cwt.; the duty being 13 *s.* 9 *d.*, that would give you upwards of half a million revenue. The next article will be cocoa: assuming again 10 per cent. of adulteration upon that (and Dr. Hassall says in 46 samples he found starch

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and other ingredients, ranging from 5 to 50 per cent. of adulteration), the consumption last year was more than four and a half million lbs.; the duty lost by this fraud, at a penny a lb., would be nearly 2,000 *l.*

2043. Mr. *Gregson.*] You assume 10 per cent. of adulteration; have you made any experiments upon that point?—I have taken them from Dr. Hassall's averages. I base my estimates on the very lowest calculations, my object being to show that adulteration not only in a moral and social point of view, but in a fiscal point of view, is detrimental to the country. Take the case of tea again; it has been shown that there are several fraudulent adulterations in tea, it is difficult to arrive at the amount closely, but even if we take five per cent. of adulteration the Government lose a great deal on that.

2044. The Government do not lose upon the import of adulterated tea?—No; this is not assumed adulteration upon the imported article, because the Government charges a duty upon all which is imported; but if the adulterated article produced at home were not in the market and the Government were more watchful over the health and comforts of the people, a greater amount of revenue would result.

2045. Mr. *Wise.*] So that indirectly, if not directly, it is most injurious to the revenue for the Government to permit lie tea or false tea to be imported and to pay duty, because that tea is used to adulterate good tea?—I do not think the Government lose by that, because they charge a duty equally upon all whether it is a high class tea or a low class tea. Therefore lie tea will come in at the same duty I presume as other teas, but the adulteration is after it leaves the docks or warehouse, when it comes into the small retailers' hands; there is where the adulteration takes place to the detriment of the small consumer. As a family man, I am in the habit of knowing what are the best quarters to deal at, and I find out the shops where the articles are least adulterated, but the poor man has not often that facility or opportunity.

2046. Do not you think it almost degrading that the Government should permit an article like lie tea to be imported at all?—I admit that; I do not palliate the fraud; the Government are much too lax with respect to a great many articles which are imported. I am now speaking of the loss which the Government sustains by adulteration at home. Taking five per cent. of adulteration on 62,000,000 lbs., which was about the consumption of tea last year, at 1*s.* 6*d.* a lb. on the average, it will give 23,250*l.* as the loss. Then I will take spices and condiments. Ginger, in the powdered state, is at least half adulteration. The quantity entered for consumption in 1852, was 19,000 cwt.; it does not usually appear in the Board of Trade Returns; the loss to the revenue would be, at 5*s.* a cwt., 22,500*l.* Pepper, again, taking only 10 per cent. over the quantity consumed to be adulteration, we have a loss to the revenue of 9,301*l.* By the substitution of cassia lignea for cinnamon, a loss results to the revenue on the consumption of 1854, which was 124,173 lbs., of about 500*l.* Upon nutmegs there is a loss of fully 500*l.*, resulting from the substitution of wild nutmegs paying 5*d.* a lb., for the cultivated nutmegs paying 1*s.* a lb. Ground and mixed spices are composed very largely of adulterating ingredients which also defraud the revenue to a considerable extent. As to tobacco, if the adulteration averaged only five per cent. on the quantity duty paid in 1854, which was 30,543,533 lbs., the loss to the revenue at 3*s.* a lb. would be 22,917*l.*

2047. Mr. *Villiers.*] Are not you under the mark in taking only five per cent. of adulteration?—I am under the mark, I think, in all my calculations. If you enlarge your margin of adulteration, you may even double the amount of loss. I have not included snuffs and cigars, and other things, which I have not been able to estimate definitely. We know that in snuff there is an immense amount of adulteration, but I have not been able to get at the figures. In the case of gin, we have heard that the adulteration is frequently 50 per cent. I will assume it to be 15. Carrying out that calculation on the whole quantity of British spirits consumed annually in the United Kingdom, which is nearly 25,500,000 gallons, at an average duty of 5*s.* 6*d.* per gallon, that duty would give you nearly half a million, 466,833*l.* In the case of wine, again, the consumption averages about 6,500,000 gallons; fully 20 per cent. beyond this amount may be fairly taken as adulteration.

2048. All the wine we consume here is imported, is not it?—It ought to be.

2049. We do not make wine in this country?—We enlarge upon it very greatly.

2050. You mean we should import much more if it were not adulterated?—Yes; wine is a very stationary article in point of consumption. The wine consumed averages about 6,500,000 gallons annually; fully 20 per cent. beyond this amount may be estimated as the adulteration; which, at 5 *s.* 6 *d.* a gallon, makes 357,500 *l.* The dilution or adulteration on foreign spirits consumed, amounting to over 5,000,000 gallons, in the proportion of only 10 per cent., and at an average of 10 *s.* duty the gallon, the respective duties being 15 *s.* and 8 *s.* 2 *d.*, entails a loss to the revenue of 250,000 *l.* It has been stated also, that in the case of beer, the loss to the revenue from adulteration is 1,000,000 *l.* per annum. Mr. M'Culloch, an officer of Excise, has given evidence to that effect. There are numberless other articles, from the adulteration of which the revenue suffers; starches, and arrowroot, and mustard: but the duty on these being very small, it is hardly worth going into an estimate of the loss on these to the revenue, whatever the loss may be to the consumer. Those which I have given would amount to upwards of 3,000,000 *l.* of loss to the revenue, looking to the question only in a fiscal point of view. With respect to spices, and the comparative duties upon them, I should like to lay a few observations before the Committee. Under the new tariff cassia bark comes into consumption at 1 *d.* the pound, while cinnamon pays 2 *d.*; cassia lignea is much coarser than cinnamon, and has a camphoraceous flavour, less pungency, and is more mucilaginous. From Malabar, the Eastern States of Asia, China, the Philippines, and islands of the Eastern Archipelago, large supplies of cassia are obtained, which is palmed off on the public for cinnamon. In some years the imports have reached 2,500,000 lbs. It is a very inferior spice to cinnamon, but it is always sold to the public as cinnamon; the public have very few opportunities of knowing the fraud.

2051. Do you mean it is imported for the purpose of being passed off to the public as cinnamon?—Yes; you never hear of cassia bark being sold, though we know that it is extensively sold instead of cinnamon. This does injury to the cinnamon cultivator; to those who lay out a great deal of money in spice cultivation. In the last six years the consumption of cinnamon has only increased from 32,732 lbs. to 54,000 lbs., whilst cassia has gone largely into consumption; the imports exceeding 500,000 lbs., whilst the quantity, duty paid, averages 130,000 lbs. per annum. It replaces the genuine cinnamon. If cinnamon bore the same duty, it would be preferred by the public, from being a better spice, with more pungency and more aromatic flavour, instead of which cinnamon pays 2*d.*, and cassia bark pays only 1*d.*

2052. What is the difference of price between the two articles themselves?—They are pretty nearly equal, as regards ordinary or second and third class cinnamon and cassia.

2053. In bond they would be about the same price, would they?—As vended I believe there is very little difference; the first quality cinnamon fetching double the price of cassia would be taken principally by druggists and confectioners, and those who really appreciate and want a good article.

2054. Mr. *Gregson.*] Is there much difference in the appearance of cassia and cinnamon?—Not in the ordinary appearance, not sufficient for the public to detect.

2055. Mr. *Wise.*] If I go to a grocer and ask for cinnamon, should I generally get cassia?—Almost invariably. The duty received from cinnamon is so small, about 500 *l.*, that it might at least be placed on an equality with cassia, so as to give the public the benefit of a better article for their money, and stimulate the production in Ceylon. The bark of the wild or bastard cinnamon (canella alba), another cheap bark, is sometimes introduced and sold as true cinnamon, and it comes in free of duty. Cassia powder is almost invariably sold for that of cinnamon. In a memorial from the nutmeg planters of the Island of Singapore, transmitted to Mr. Gladstone when Chancellor of the Exchequer, they remonstrated against the injustice of permitting the importation of wild nutmegs into the British markets at the reduced duty of 5*d.* per lb., which gives them a great advantage over those grown in the Straits settlements, paying the higher duty of 1 *s.* This bounty in favour of the wild nutmeg has served to introduce them largely into the London markets, and also the nutmegs of the Dutch Islands, passing into consumption as they do for one and the same

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same article, and commanding the higher price. The memorialists add, "That the real 'wild' nutmeg, although it resembles considerably in shape, mace, &c., the nutmeg of commerce is destitute of aroma and flavour, and is entirely without value as an article of trade; that the maintenance of two distinct rates of duty appears highly inexpedient, for the following reasons: first, if, as contended, the so-called 'wild' nutmeg, now admitted at the lower duty, is in all essential respects the same as that grown by the memorialists, the protection granted to the foreign production is a grievous injustice to the British planters; second, if, as a vegetable production, the so-called 'wild' nutmeg is a different article from the cultivated one, and of inferior value, its admission at a lower rate of duty offers great facilities and a strong temptation to the perpetration of fraud upon the British consumer, seeing that, as has already been stated, no such distinction between the two is known in the retail trade; the British consumer, therefore, does not reap any advantage from this lower rate of duty, and the British planter is injured by his highly-taxed produce being displaced in the market by this inferior article, the importers of, and wholesale dealers in, the wild nutmegs being the persons who most largely profit by the difference in the duty." That was an extract from the memorial, which, however, has had no effect, and the distinctive duty still remains as it did before. The wild nutmegs are invariably sold in the shops for the true nutmegs.

2056. Mr. *Gregson.*] Before the duty is paid, the wild nutmeg is not of the same value as the cultivated nutmeg, is it?—Wild nutmegs are never enumerated in the price currents or sale catalogues, although they may enter the Customs as such. The price of the cultivated nutmeg is higher, in consequence of the expensive culture. The nutmeg tree takes a long time before it bears fruit. The ordinary public who receive the wild nutmeg, have no means of testing the difference.

2057. The cultivated nutmeg sells at a higher price in bond than the wild nutmeg?—I believe it does.

2058. Mr. *Wise.*] Does not the size and shape, to some extent, prove which is the wild and which is the cultivated?—It looks rather different in that respect; but the public, who buy them in small quantities, have very seldom an opportunity of knowing which is the true and which the false. Wild or spurious nutmegs can be bought at about 10 dollars the picul (which is 1¼ cwt.) at Singapore, brought in by the native boats from Borneo, Celebes, and New Guinea; while cultivated nutmegs have never been below 60 dollars the picul, owing to the expense of culture, and the time required to arrive at full bearing. Although nearly devoid of aroma, the wild nutmegs are extensively substituted for the true spice. The holes of bad nutmegs, bored and injured by insects, are filled in with various substances to deceive purchasers; that is to render them passable for sale, and the worst are limed. That, perhaps, is not an instance of adulteration, strictly speaking, but it is to make them bear a better appearance in the market. Wild mace is also occasionally used for adulterating the true mace. At first sight it is not easily to be distinguished; the colour is exactly alike, but it has not the least spicy flavour, and when chewed has a kind of resiny taste. Black pepper is notoriously adulterated; long pepper, pieces of the stem, and other foreign substances are ground up with it. I have seen a species called coriander pepper which, being cheaper than the genuine white pepper, is sometimes ground up with it.

2059. Mr. *Villiers.*] Can you tell the Committee anything about Cayenne pepper and its adulteration?—It comes here principally in the pod; it seldom, I think, comes ground. The principal pod used for making Cayenne pepper is the small bird pepper. Capsicums, and those which grow larger, are used for condiments abroad, but seldom come home for the purpose of Cayenne pepper. Red pepper ground in this country is extensively adulterated by the persons who have the manipulation and retail sale of it; it would never be adulterated abroad; it may come in small quantities ground, but the growers have not the conveniences for pounding and grinding it that we have at home.

2060. *Chairman.*] You do not speak, generally, as to the adulterations which take place in this country?—I have made some inquiries upon these points in the course of forming a museum of trade products for my own use, and frequenting brokers' salerooms in the City, but I cannot speak confidently or generally as to the practice in that respect.

2061. Can you give the Committee any information as to the state of the law in other countries with a view to checking these adulterations?—I have copies here of the American law, to which Mr. Herring alluded just now, for the inspection of drugs and chemicals which are imported. If the Committee will permit me, I will here make some suggestions which occur to me as to the checks which I think might be put upon the importation of adulterated articles. The Excise regulations, as respects articles of extensive consumption, appear to me comparatively obsolete, and very far behind the requirements of the age. There is too much laxity and injustice on the part of the Treasury, which sanctions admixtures and adulterations in a variety of instances, as in the cases of chicory and coffee, cassia and cinnamon, wild and cultivated nutmegs, lie tea, and other imported articles, but is most virtuously indignant at adulterations carried on at home in tea, tobacco, snuff, and other heavily taxed articles. The officers of the Customs are, generally speaking, extremely ill-informed as to the quality and purity of various articles imported, such as starches, oils, drugs, &c. I consider it would contribute greatly to check adulteration abroad by natives if scientific and thoroughly competent examining officers were appointed at each of the principal ports, whose duty it should be to examine and report upon the quality of all articles introduced, whether for manufactures or food, but especially the latter, instead of submitting samples, as is too frequently the case at present, to interested parties. In most of the principal States of Europe there exists a Board of Health, or Conseil de Salubritie (somewhat differently constituted to our Metropolitan Board), composed of eminent physicians, chemists, and engineers, appointed to watch over whatever may affect injuriously the public health and comort. In France this commission consists, for the capital, of seven members, who have the surveillance in this respect of markets, factories, places of public amusement, bakeries, shambles, secret medicines, &c. In England we have excise officers charged to protect the revenue, and some few inspectors of nuisances, but no general body with branch agencies, whose duty it should be to examine into the wholesomeness, purity, and good quality of the common articles of food of the people, for these have in too many instances neither the skill to discover and identify adulteration nor the time or money to devote to prosecution when such frauds or misdemeanors are detected. In the Prussian municipal law there are some very wholesome enactments with regard to the sale of spoilt or adulterated victuals. They recite that "no person shall knowingly sell or communicate to other persons for their use articles of food or drink which possess properties prejudicial to health, under a penalty of fine or bodily punishment. Whosoever adulterates any such victuals in any manner prejudicial to health, or mixes them with unwholesome materials, especially by adding any preparation of lead to liquors, shall, according to the circumstances of the case and the degree of danger to health, be liable to imprisonment in a correction house or in a fortress during a period varying from one to three years. Besides this punishment, those who are found guilty of knowingly selling victuals which are damaged or spoiled, or mixed with deleterious additions, shall be rendered incapable for ever of carrying on the same branch of business. The articles in question shall be destroyed if incorrigibly bad, but if otherwise they are to be improved as far as possible at the cost of the culprit, and then confiscated for the benefit of the poor. Further, whosoever mixes victuals, or other goods, with foreign materials for the purpose of increasing their weight or bulk, or their seeming good qualities, in a deceitful manner, shall be punished as a swindler." The American Act to which I alluded, came into operation in 1848. It was a law to prevent the importation of adulterated and spurious drugs and medicines; large quantities of these had been shipped from this country and from France, and they were so wretchedly compounded as to be positively injurious. The Americans tried to stop the introduction of them at the chief ports, but I am not aware that they carried the law into operation in the inland towns of the country. They appointed a qualified inspector at each of the outports, who was to examine and report upon all which fairly reached the standard, and to re-ship all those which were deleterious, or which were not of the proportionate strength. The result of that was, that a large quantity were refused within a short period. I have here a report from the trustees of the College of Pharmacy in New York, of the quantities they confiscated, and they speak of various gross frauds and adulterations. The general result was that blue pill, opium, quinine, oxide of zinc, and a variety of other

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things, were found to be injuriously compounded for the Atlantic cities. The fault, I believe, lies in this: Orders come home from druggists to a merchant instead of coming to a wholesale druggist; the merchant wishing to obtain the largest profit ascertains what the things can be supplied for, and not being a judge of the quality of them, thinks that those which can be obtained cheapest will answer his purpose best. The colonies, I think, suffer even more than the home public from adulterated and inferior drugs; parties who go and establish themselves as chemists and druggists out there, are not always a superior class of men; any person almost may start a chemist and druggist's shop in the colonies. He has usually to get his goods through a merchant there; that merchant has his correspondent in London, to whom he sends the order. There is thus a double commission to be paid before the goods reach the druggist's hand. If the druggist were always able to order his goods himself, he would probably get them purer than he does. I think that if once a check were put upon adulteration in this country, many of the colonies, for their own sakes, would adopt the same course there.

2062. Mr. *Villiers.*] What is the date of the new system which has been established in America?—It was commenced in June 1848. The confiscation of drugs has been immense, and it has had a very beneficial effect. They themselves admit that the number of articles imported, of an adulterated character, are now very small compared with what they were. The Americans are not so much manufacturers of drugs and fine chemicals as we are. England, France, and Belgium prepare the principal quantity of the finer preparations of pharmacy, and the Americans depend very much upon us.

2063. Mr. *Gregson.*] In some of those articles you speak of, there was only one-tenth or one-twentieth of the pure commodity?—Yes. I do not know that that applies to all, though the adulteration in most articles was very extensive. There is one matter which occurs to me as being exceedingly singular, which is, that the consumption of malt and hops continues stationary, though the consumption of beer, with the increasing population, must have increased very largely. For the last 15 years there has been scarcely any variation in the amount of hops consumed, and some substances must, therefore, be used very extensively to make up the difference. With the large and increasing foreign trade and home consumption of malt liquors, and the fluctuations in so uncertain a crop as hops, for which even an export demand has now arisen, it appears to me that attention should be directed by our chemists to some other legitimate ingredient for brewing, calculated to supply the tonic and bitter lupuline principle requisite. It is not all soils that are suited to the culture of hops; and the extent of land under cultivation in the last three years has averaged 50,000 acres, being only 7,000 acres beyond the culture 30 years ago. The home production in the last 10 years has scarcely increased at all, and yet the shipments of beer and ale have more than trebled in value, and the home consumption must necessarily have largely increased also. What, therefore, takes the place of hops? The quantity of foreign hops charged with duty last year was only 4,600 lbs., a very small addition to the home-grown quantity. The quantity of malt charged with duty has remained almost stationary in the last 15 years; or, if anything, declined. The quantity consumed in 1840 having been about 42 ½ million bushels, whilst last year it was under 37 millions. The declared value of the beer and ale exported in 1843 was 383,131 *l.*; but in 1853 it had increased to 1,289,382 *l.* In 1848, only 136,724 barrels of ale and beer were shipped, but in 1853, 416,422 barrels were exported. The malt and hops, however, according to the official returns, though beer is as popular a beverage at home as ever, show scarcely any increase in the past 12 years, as the following figures of consumption will show:

	Hops used.	Malt.
1842	35,432,142 lbs.	35,851,394 bushels.
1853	31,751,693 „	42,039,748 „

2064. Your point is, that the export and consumption of beer having been increased, and the yield of hops not increased in proportion, some substances must have been used instead of hops?—Yes, some substances must have been used; I do not say whether they are necessary or proper.

2065. *Chairman.*] Where do you get that fact as to the consumption of malt liquors

liquors at home?—I have various official and trade circulars with regard to the consumption and export of malt liquors.

2066. Mr. *Villiers.*] Is there any evidence of it, except the malt duty?—No; beer is drunk as much, or more than ever, apparently, and the population has largely increased.

2067. Mr. *Kinnaird.*] Are you prepared to tell us what substances have been used in the place of malt and hops?—I can only judge from the imported articles. Among the substances which I should suppose are used to adulterate beer are camomile and cheretta root, to impart bitterness; grains of paradise, to give pungency; and sweet flag-root, to impart a peculiar flavour, after that of some celebrated localities. In the suburbs of London, I may mention that it is a common practice with the publicans to adulterate beer on Saturday nights much more than on other nights, and with very deleterious ingredients. I know from relatives of my own, who have given me information, that diarrhœa and bowel diseases are much more prevalent on Sunday than other days, in consequence of the use of beer which has been bought on Saturday night and Sunday. Whether it is to induce thirst that some noxious ingredients are added I cannot say. The cases of drunkenness which occur on Monday have, I think, been very much the effect of those noxious and stupefying products, which are added more on Saturday and Sunday than on any other day.

2068. Mr. *Villiers.*] Have you any precise data to speak from in giving that opinion, because it is rather at variance with the opinions of those who have stated that there are adulterations in beer, but have denied that the ingredients are deleterious?—I cannot give you any precise information; I only speak from the information of others, who have told me that the effects of beer obtained on Saturday night or Sunday are much greater than the effects of beer taken on other days. A few other ingredients come largely into this country, which, it has been stated, are some of them used for the purpose of imparting a bitter to beer. Quassia, or bitter wood, an intense bitter, obtained from the West Indies and Central America, which was formerly prohibited by law from being employed as a substitute for hops in brewing, by a restrictive duty of 8*l.* 17*s.* 6*d.* per cwt. being levied on it, is now again encouraged, being admitted under the present tariff at 1*s.* per cwt. The extract of this and other ingredients is liable to a 20 per cent. duty, but they very seldom come in that shape. Cocculus indicus, another intoxicating drug, is also favoured by a reduction of 30 per cent., and about 150 tons are annually imported, chiefly, I suppose, for the use of brewers.

2069. Have you observed a gradual increase in the import of cocculus indicus?—There are no records which would enable me to state that positively. In the preparation of my work on the subject of commercial products, I had the greatest difficulty in getting at the statistics of the different drugs imported.

2070. Is not it an enumerated article?—No; it does not appear in the Board of Trade Returns.

2071. Mr. *Gregson.*] Is cocculus indicus imported free of duty?—No; there is a small nominal duty.

2072. *Chairman.*] Are you aware whether the price of cocculus indicus has considerably increased of late?—It has, I believe, nearly doubled. I understand, from brokers and from friends of my own, that it has very much increased.

2073. Mr. *Kinnaird.*] Is that owing to its use in adulteration?—That is an inference; I cannot state it as a fact; one pound of the drug is said to go as far as a sack of malt in brewing. Nux vomica, again, another narcotic seed, comes into the country in about the same proportion, and is only subject to a duty of 2*s.* the cwt.; 200 tons of the hot, acrid seeds of cardamoms, or grains of paradise, are also annually imported, and chiefly used to give an artificial strength to beers and spirits. There is one point which I think I may here allude to. It appears to me that the suppressive measures which have been passed with regard to beer, and the attempts to induce temperance, have driven many parties to the use of opium. The consumption of that drug appears to me to have increased very largely. I do not know whether opium has come into use for the purpose of producing intoxication in the manufacturing and other districts. It appears to be largely used for that purpose in America.

2074. Mr. *Villiers.*] You say opium is more consumed than it was?—It is.

2075. Your only ground for saying so, I understand, is, that there is more imported?—Yes.

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2076. You do not follow it after it has been entered, do you?—No. I had occasion, some time ago, to trace the consumption of opium, and it appeared to me that the quantity used, whether it is for medicinal purposes or other purposes I cannot say, was very great.

2077. Your opinion is a little at variance with what we have heard from other quarters, that whereas they used to sell opium pills in the manufacturing towns, which were extensively consumed, that practice has now almost ceased?—I do not know where the opium goes. I am not at present prepared to show that; but my information certainly proves that the consumption is much larger than would be required, I should suppose, for medicinal purposes. I think, on an average of the last three years, 63,000 lbs. of opium have been retained yearly for consumption.

2078. Mr. *Gregson.*] Are not you aware that the export to Australia and the other colonies has increased, as well as the import?—I only take the quantity which is consumed in this country. I differ from Mr. Redwood in the evidence I have heard, that Indian opium does not come in here. I think it does come in.

2079. Mr. *Kinnaird.*] In large quantities?—I am not aware in what quantities. I have not heard that there are any suppressive measures to prevent opium coming to this country by the East India Company; they have certain fiscal regulations as to its growth and export. I have not heard that Indian opium is inferior to Turkish opium. Mr. Herring, I think, said it was equal. The Americans carry on a large trade with China, and opium goes first from Bengal to China, and from thence some of it reaches the colonies and other countries. The return does not show the quarters from whence our opium is obtained.

2080. Are you aware that opium was prescribed in much larger quantities during the prevalence of the cholera of late years?—I admit that, but yet not to an extent to require so many more thousand pounds of opium annually, 50 per cent. increase in the last three years. The production of opium in Bengal alone exceeds 5,000,000 lbs. per annum. In America it appears to be used largely; here is a paragraph from an American paper; "The New York Evening Post" contains a communication from a private source, calling attention to the increased use of laudanum by many young persons of that city, who procure it, the writer says, in large quantities at the druggists' and swallow it like water. "There cannot be a doubt that of late years the consumption of laudanum and opium has greatly increased, especially in the Atlantic States. It would be well if some method were devised to put a check to the growing evil. In Europe its sale is forbidden except under an order from a physician."

2081. *Chairman.*] Is there any other observation which you wish to make?—The Apothecaries' Company used to have authority under their charter to inspect druggists' shops; whether that power has lapsed I am not aware; I think it is used conjointly with the College of Physicians. The College of Physicians, I believe, possess the power of visiting druggists' shops and inspecting drugs, and confiscating those which are impure or adulterated, and fining the shopkeeper according to the frequency of the offence; but I believe no such check exists in the provincial towns.

2082. Mr. *Villiers.*] Do they exercise this privilege?—Very seldom; they go round occasionally in London. It appears, however, to have gone into desuetude, but I think the inspection might be carried out advantageously, especially in the suburbs of London and in the provincial towns.

2083. The policy of it has been already recognised?—Yes. There are frequently "clearance sales" at the docks, and sales of sea-damaged or injured goods at the offices of the City brokers, where articles of a most worthless character are bought to be mixed probably with better articles, either for home use or exportation. It appears to me that those go generally into consumption somehow; whether they are used for adulteration with other articles, or whether they are used for the purpose of sending out of the country, I am not aware.

2084. Have you heard what has been suggested by other witnesses, that we should have a system of inspection; and have you considered whether that is open to any objection?—At the seaports I think there should be such an officer. I do not know how it is to be carried out in towns generally; people do not like a system of espionage or examination.

2085. They do not like it in the outports, do they, if they wish to enter articles

articles which are not pure; but would it not be possible to appoint an officer who could be referred to in case of a charge being made against a person selling impure things?—I think that might be desirable.

2086. He might not go round constantly for the purpose of examining goods in shops, but he might be there qualified and ready to be referred to; do not you think that would have a good effect?—I think it would be very beneficial; the fear of publicity would, I think, have the greatest effect in checking adulteration.

2087. It would not be necessary to impose heavy penalties, looking to the great mischief it would do to any tradesman to be detected?—It would not.

2088. You cannot give the Committee any account of the inspection in the inland towns in America?—No, my attention has been principally directed to the foreign arrangements in the ports of export and import.

2089. Your view is, that it would conduce to the public health, and would save a large amount of revenue, to introduce some check against the adulteration which is now practised?—Yes, and it would conduce to a higher system of morality. I quite agree with former witnesses that a great deal of adulteration is done abroad. I was talking to the manager of the Gutta Percha Company some time ago, and he mentioned the fact that the native collectors have learned to adulterate that material extensively; that they put stones and iron into the gum to add to the weight; he even found a cannon-ball in one of the lumps of the article.

2090. You state that your reason for expecting a greater revenue would be that people would consume more of the imported article which pays duty; have you considered that if they consume more of any article, you increase the demand for it and raise the price of it; do you think the consumption, with the price increased, would be equally great?—I think the competition of the different producing countries is such now, that you would get more than you need of sugar, and coffee, and other articles of the kind; the supply is generally fully equal to and greater than the demand.

2091. Do you think that that is the case with such articles as you have specified to-day?—I think so; tea, sugar, coffee, and all those articles which are generally consumed; only increase the demand, and you will increase the sources of supply.

2092. That has been the case with many articles notoriously, has not it, that with increased demand the price has fallen?—It has. It may injure our own colonies in some measure, because many of them have not the advantage of a full supply of labour. In the East, where labour is very abundant and cheap, they are able to produce at a lower price than the western colonies, having less advantages, can do.

2093. Mr. *Gregson.*] By those admixtures, is not the price of the commodity so much reduced as to increase the import very much?—I do not think the price is very much reduced. Those are articles which the public know extremely well the wholesale prices of, and it is very difficult to raise the retail prices much upon them. There are a few articles of provisions which have come under my notice; flour from America, for instance, in which a considerable amount of adulteration goes on. The flour gets musty, and a great deal has had to be re-shipped to America, and the Americans have called the attention of their own people to it. The imports into Liverpool of American flour are very large, much of which is sea-damaged, musty, or adulterated, and over which there is no supervision. Indian corn gets very bad indeed, unless kiln-dried. They have lately begun to do that; but formerly it was not done; it came over in a very deteriorated state, and I have no doubt it contributed to a very unfavourable state of health among the Irish people, who principally consumed it. Dr. Beck, in an official report on the breadstuffs of the United States, made to the Commissioner of Patents, a year or two ago, states that mixtures of damaged, inferior, and good kinds of flour had been largely exported to Great Britain. The injury to health by the use of these sour and sophisticated flours must be very considerable, when we remember that the imports into Liverpool alone of American flour amount annually to 800,000 sacks; that was the official report of the officer appointed by the American Government. They have at some of the American ports an officer, who is appointed to examine and to brand beef, pork, fish, &c. distinguishing such as are considered first class and second class, according to the quality, but that is not compulsory. Parties who choose to avail themselves

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of this inspection do so; and it enhances the value of the product when it arrives over here; but even that is liable to fraud; the branded casks, after being emptied, are re-filled, and done up in such a way as to deceive the purchaser. With respect also to salted provisions coming over from America, they are very often in a very bad state, and there should be some supervision of them. There is no person whose duty it is to report upon them here, and they frequently come into consumption in a very injurious state. Lard has been already spoken of; that is very largely adulterated in America.

2094. Mr. *Kinnaird.*] With what ingredients is it adulterated?—With potato flour, water, lime, and some heavier ingredients; flour is one of the main ingredients used in the adulteration. Preserved provisions also require some revising officer to examine. With respect to milk, again, even the Americans themselves are turning their attention to its adulteration. Milk is in such a bad state in some of our large cities, owing to the nature of the substances on which the cows are fed, that very bad effects result to the public health. In the course of inquiries made a year or two ago, by a committee of eleven appointed by the Academy of Medicine of New York to inquire into the effects, proximate and remote, on the general health of the city, arising from various nuisances and adulterations, they were specially directed to investigate the milk question, so fraught with important results, for to the sale of impure milk must be attributed much of the infant mortality in large cities; and in the Report they drew up, appears this resolution: "That, in the opinion of this Academy, the milk of cows shut up in stables and fed on distillery slops is not only less nutritious than that of unconfined and well-fed animals, but is positively deleterious, especially to young children, and is a fruitful cause of many fatal diseases."

2095. Do you confirm the opinion as to the bad quality of much of the milk which is sold here?—I do; I think there is a great deal of bad milk vended, in consequence of the close confinement of the animals. Evidence has been given by others who have investigated the subject, to show that diseases are prevalent in the teats of the animals which it is appalling to think of, and the milk must be necessarily injurious to health. The same is the case with other things which are consumed in some of the low neighbourhoods of London. Any one who is continually in the habit of passing through them must see the spoiled meat, which all goes to the chopping machine, and is made up into sausages. An officer at Birmingham, only last month, found that a great many of the horses and other animals which died there, were made up into sausages at Newton Heath. Oils, again, are very much adulterated; there is not an oil which comes into commerce for manufacturing purposes, or for culinary use by the public, but is adulterated in some way or other.

2096. Do you allude to spermaceti oil, as imported from America?—Yes; there is not an animal or vegetable oil which is not mixed with some other oil which is less valuable. In consequence of the large quantity of oils used at the present day for machinery, woollens, &c., many varieties are introduced into the market, and thus much temptation exists to mix or adulterate the more expensive of them with the less costly kind. Fish-oils exclusively assume a brown or black tinge when a stream of chlorine gas is passed through them. The specific gravity of oils affords a very simple, and what can be said of few other oil-tests, a very satisfactory method of detecting some of the adulterations to which they are subject. Sperm oil in particular is distinguished by its low specific gravity; it is usually adulterated with southern whale oil, and some other oils which mix equally with it. Olive oil is a large article of consumption; it is mixed with nut-oil and poppy-seed oil; the latter has a stupifying and a very injurious effect upon the health; it has deleterious properties which ought to prevent its being brought into consumption for domestic purposes at all; but there are no means of determining whether it has been adulterated at home or abroad.

2097. Do you think that salad oil is constantly adulterated with pernicious substances?—Yes; the choice pure olive oils are so dear, that various oleaginous products have been mixed with them, some of which are, I have no doubt, exceedingly prejudicial to health when taken as food.

[*The Witness hands in the following Papers:*]

EXTRACT

EXTRACT from CIRCULAR issued by the Trustees of the College of Pharmacy in *New York* in 1848.

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BLUE PILL is imported containing a per centage of mercury from 10 down to 7½, mixed with blue clay and Prussian blue to give the proper design and colour. Two importations from the manufacture of William Bailey, of Wolverhampton, have already been exposed; the first in 1845, the other, recently. Its composition, according to the analysis of our Professor Reid, is mercury, earthy clay, Prussian blue used in colouring, sand in combination with the clay, soluble saccharine matters, insoluble organic matters, and water. Very large quantities of rhubarb much decayed, the better parts of which are dark coloured, with scarcely any taste or smell, having probably been exhausted to make extracts, come from England, invoiced there from 1½ *d.* to 3 *d.* sterling per pound. It is intended and used for powdering, colour being given to it by turmeric, &c.

The article called oxide of zinc on the English labels is generally carbonate of zinc, being imported, it is said, at a price which precludes the possibility of honest preparation. All that is received under the name of precipitated sulphur or "lac sulphur," as the merchants commonly term it, except when it is expressly ordered from an honourable manufacturer, contains from 80 to 90 per cent. of sulphate of lime. Opium is often invoiced at one-third the value of good quality, and is found, upon examination, not to be worth even that. The same may be said of scammony. Most of the foreign extracts are not what they profess to be, and cannot be relied upon in the treatment of disease. The salts of quinine, morphine, and all the more costly chemicals, are greatly adulterated. The agent of an English manufacturer of chemicals, extracts, and many other preparations used in medicine, has said, and his remarks are in print, that it is a regular and systematic business, carried on by his principal, and others in his line, to make articles for the American market of different qualities; one for the Atlantic cities, and another very much inferior for the West; meaning thereby our Western States. He gives us for instance, the following quotations: compound extract of colocynth, 9 *s.* 6 *d.*; ditto for the West, 5 *s.*; the latter, as we are allowed to infer, containing no scammony, only the poorest sort of aloes, and but little, if any, colocynth or extract from it. Again, we have blue pill, 3 *s.* 9 *d.*; ditto for the West, 1 *s.* 8 *d.* "It is not wonderful," remarks Silliman's Journal, "that such uncommon doses as we hear of are taken, and indeed required, at the West, and that disappointment is everywhere experienced by physicians in the action of medicines." And these examples are but few out of many that ight be given.

THE following is a SUMMARY of the Chief Clauses of the AMERICAN ACT, approved by the President of the United States, 25 June 1848.

THE 1st section enacts, that from and after the passing of the Act all drugs, medicines, medicinal preparations, including medicinal essential oils and chemical preparations, used wholly or in part as medicine, imported into the United States from abroad, shall, before passing the Custom-house, be examined and approved, as well in reference to their quality, purity, and fitness for medical purposes, as to their value and identity specified in the invoice.

Section 2 enacts, that medicinal preparations or otherwise, usually imported with the name of the manufacturer, shall have his name, and the place where they are prepared. permanently and legibly affixed to each parcel, or they shall be forfeited.

Section 3 enacts, that if, in the opinion of the examiners, they are found to be so far adulterated, or in any manner deteriorated, as to render them inferior in strength and purity to the standard established by the United States, Edinburgh, London, French, and German pharmacopœias and dispensatories, and thereby improper, unsafe, or dangerous to be used for medicinal purposes, they shall not pass the Custom-house.

Section 4 gives the owner or consignee who is dissatisfied with the examiner's report, power to obtain other scientific and analytical reports as to the strength and purity of the drugs, &c. They may also be re-exported within six months; and if not then shipped, they are to be destroyed by the collector, the owner, &c. being liable to all charges that may have accrued.

Section 5 enacts, that suitably qualified persons as special examiners are to be appointed by the Secretary of the Treasury at New York, with a salary of 1,600 dollars, and at the ports of Boston, Philadelphia, Baltimore, Charleston, and New Orleans, at 1,000 dollars each per annum.

According to a report on the practical operation of this law, read by Dr. Bailey before the New York Academy of Medicine, in June 1849, during the past nine months of his inspection at the port of New York he rejected 45 tons of spurious or vitiated drugs, upon which the importers would have made a profit of 10,000*l.* to 15,000*l.* Among the articles rejected and confiscated were 7,528 lbs. of rhubarb root from Canton, 545 lbs. from Hamburgh, 1,075 lbs. from Marseilles, and 6,902 lbs. from London; 1,681 lbs. of opium from Marseilles, 860 lbs. from Smyrna, and 1,743 lbs. from London; 2,977 lbs. of gum myrrh from London, 5,091 lbs. of jalap root from Vera Cruz, and 3,490 lbs. from Tampico;

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1,400 lbs. of senna from Leghorn; 1,785 lbs. of spurious yellow bark from Bordeaux and Marseilles; 12,800 lbs. of spurious cinchona bark from Carthagena, 1,345 lbs. from London, and 2,530 lbs. from Antwerp and other places; 1,414 lbs. of gamboge, 4,894 lbs. of senna, and 1,104 oz. of croton oil from London; and 1,450 lbs. of sarsaparilla from Tampico. The opium, gum myrrh, gamboge, and senna were greatly adulterated, and also deteriorated by age and other causes. A considerable portion of the rhubarb root was in a deteriorated and decayed condition from age, and the remainder had been exhausted of its active properties for the purpose of making extracts. Much of the jalap root was of the spurious or bastard varieties, mixed with a small proportion of the genuine root. The spurious yellow bark was in its natural state; but being of those bastard varieties of cinchona that afford no quinine, and very little if any cincochine, it is worthless for medicinal purposes. It has heretofore, from its low price ($4 per 100 lbs.), been imported, powdered, and not only extensively used in the adulteration of the genuine yellow bark (cinchona cordifolia), but sold in large quantities to the unsuspecting for the genuine article.

Dr. Bailey states, "I have in my possession the voluntary confessions of a drug-grinder who has retired after amassing a fortune in the business; but I will not swell this report by entering at this time into an extended detail. That duty shall be performed by making it at some future time the subject of a chapter in the chronicles of imperatively demanded reforms. Suffice it then to say, that most of the farinaceous substances, such as rye, corn, wheat, rice, gray sago, &c., together with various colouring agents, are too frequently, if not constantly, to a greater or less extent, brought into requisition, to say nothing of the mixing in the mill of a large portion of the inferior with the good article; as well as the mixing two or more articles entirely dissimilar in their active principles, such a combination for instance as crystals of cream of tartar, alum, and whiting! This last villanous compound, when nicely powdered, is denominated at the mill 'grocers' cream of tartar,' but that it is sold and dispensed, particularly in this country, as a genuine article, I have the best reasons for believing."

From *Charles E. Smith*'s Statement of the Drugs, &c. in the four Dock and various other London Warehouses on the 31st July in each Year, with the Imports and Deliveries, January to July.

		Imports.	Deliveries.	Present Stock.
Cardamoms, chests of 4 to 5 cwt. each	1855	111	215	204
	1854	507	377	394
	1853	266	349	268
	1852	480	437	220
Coculus indicus, bags, &c. of about 1 cwt. each	1855	131	571	4,817
	1854	1,651	650	3,078
	1853	749	139	1,042
	1852	25	124	192
Nux vomica, packages (usually bags of 1½ cwt.)	1855	1,893	1,148	1,969
	1854	405	1,064	2,384
	1853	839	941	3,735
	1852	327	872	4,853

This is exclusive of the trade at Liverpool and other ports.

John Postgate, Esq., F.R.C.S., and recently Lecturer on Anatomy at Sydenham College, Birmingham, called in; and Examined.

J. Postgate, Esq., F.R.C.S.

2098. *Chairman.*] YOU are a Surgeon resident in Birmingham?—Yes.

2099. And you have devoted a good deal of attention to the question of adulteration?—For the last two years I have been engaged in testing and analysing the different articles which have come under my own notice.

2100. Have you taken considerable pains in interesting the public in this matter during the last year or two?—Yes; I originated the present movement, by communicating with the Chairman on the 7th of January last year, suggesting the appointment of a public analyser, and also that an Act of Parliament should be introduced, to check adulteration. My attention was attracted to the subject by a violent purging and vomiting produced on a patient by adulterated coffee, and also by the state of the bread at that time in Birmingham.

2101. You called some meetings in Birmingham, I believe, and you then entered

entered into an extensive correspondence on the subject with some of the leading chemists and scientific men of the country?—Yes, I did communicate with individuals and societies, wishing them to aid in the matter.

2102. Mr. *Gregson.*] You alluded to a person being injured by adulterated coffee; what was the ingredient in it?—I do not know. It was adulterated extensively with chicory; it formed a black solution in water. I do not know the precise ingredient in the coffee.

2103. It was sufficiently adulterated to produce disease?—It was adulterated sufficiently to produce an effect upon the system.

2104. Did you say that you recommended the appointment of a public analyser?—I recommended that a public analyser should be appointed by the town councils of large towns and cities, and by the county magistrates for districts. I also suggested the appointment of the present Committee of Inquiry.

2105. *Chairman.*] Will you favour the Committee with your experience as to adulteration, whether in articles of food or drugs?—I have found alum in flour in all the samples I have examined, except in one instance, and that was supplied to me by the Birmingham Flour Society, an institution established for the supply of pure flour to its shareholders. Those samples have been tested continually since January last year.

2106. Mr. *Gregson.*] Were they bought promiscuously at different shops?—They were samples which came into my own house, and were obtained from other individuals by myself. Alum exists in a free state in flour, and can be readily separated by mixing the flour with water, and filtering the mixture. In one case, by filtering and evaporating, I was able to obtain 10 grains of alum from 100 grains of flour. A quantity of flour was supplied to a magistrate at Evesham of an unsound description; it was returned as unsound, and unfit for use. The dealer, who was a miller in the town, having a quantity of alum powdered, threw into the flour so returned a large quantity of that alum. The consequence was that it was totally unfit for use, and the persons, who partook of some provisions made of this flour, were affected with illness. A surgeon resident in Birmingham brought a quantity of it to town and submitted it to my inspection. You could taste the alum in the flour, and on mixing it up with water, filtering and evaporating it, you had crystals of alum formed; that would not be the case probably with the entire flour, but it was badly mixed; the alum had been thrown into it in a careless way.

2107. Was alum the only ingredient present?—It was the only ingredient I ascertained to be present in that sample; it was added for the purpose of making the flour sound. I have here a certificate from a person who was engaged in the practice of adulteration, which I would beg to read. He states that he became very ill in consequence of inhaling alum dust during the process of grinding. He states, "I have been a miller 25 years, and during that time have worked in numerous mills in various parts of England, and can certify that alum to a large extent is regularly ground up with wheat. I have ground alum separately and mixed it afterwards with flour. Beans also are continually ground, mixed up with wheat flour, when the price of wheat is high. My health is in a bad state in consequence of the alum-dust given off during grinding. I feel that I shall never be able to follow my trade again, and make this statement for the public benefit, and also to prevent injury to other workmen." This was witnessed by myself and by a solicitor of Birmingham.

2108. He had been employed by various dealers in flour, had he?—Yes; in the Midland Counties especially.

2109. And he says they all mixed their flour?—Yes; and he furnished me with the names of the parties who did it.

2110. *Chairman.*] Have you any experience of your own as to the adulteration of flour?—The experience I have is this, that alum in flour is exceedingly pernicious to health; it has a very peculiar effect upon the system when taken in bread.

2111. Even a small quantity taken every day, I suppose, would be injurious?—I may state to you the effect of alum upon my own constitution. Persons may suppose that they are affected by alum in bread when it may be from another cause; however, speaking for myself, I have had bread containing alum.

2112. Mr. *Gregson.*] In what proportion?—I have had a loaf of bread in my house containing 3.5 per cent. of alum.

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2113. And that was injurious?—It was decidedly injurious. That is a large and unusual quantity of alum in bread. The quantity in bread I should suppose would be one part in 400.

2114. Is one part in 400 injurious?—I think so; the effects upon the system which I have observed, are these: The gums become swollen; the tongue more or less so. There is an unpleasant taste in the mouth, and the stomach itself becomes affected. There is a quantity of acid secreted, and the individual suffers from an attack of dyspepsia without knowing the cause. Probably he changes his baker, or gets a fresh sample of bread, and the attack subsides; but by the repeated introduction of this alum into the system, he is more prone to another attack; it seems to accumulate as it were in the system; at least that has been the case with myself.

2115. One in 400 being prejudicial, what is the usual quantity of alum introduced by bakers generally?—It varies very much. I have mentioned already that I have met with one case in which there was 3½ per cent. The precise quantity I am not prepared to state. I believe the regular consumption, even of a small quantity of alum, is injurious. With regard to bean and pea meal in flour, I believe they are very injurious to delicate persons. They produce flatulency and acidity of the stomach. Indian corn in flour is very injurious to delicate persons.

2116. Have you found beans mixed in any considerable proportion with flour?—I have found them mixed, so as to be perceptible to the palate. There was a statement made by the Mayor of Cork, a gentleman who communicated with me early in this movement with reference to the state of corn in Ireland, corn which had undergone a kind of decomposition, and was quite unfit for use. I am in a position to verify that statement; and I can do so by producing a witness to the Committee who was a party in grinding up a quantity of corn which had been warehoused for, he told me, six or seven years, which had undergone a kind of decomposition, that positively when it passed through the mill and was dressed, it fell through the fingers, as he stated, like lime. He watched the effects of the consumption of that flour, and he stated to me that it had produced bowel complaint wherever it had been consumed; that it was unsaleable in this country, and had been sent to Ireland.

2117. Is not it a very rare case to keep corn six or seven years?—This occurred four years ago; I had a communication from a Mr. Rimmington, an analytical chemist, of Bradford, in which he stated that he discovered some sulphuric acid and oxide of iron in flour; the adulteration of flour with alum in that district had been prevented by the imposition of fines upon the parties. Not many years ago an accident occurred at Kidderminster by acetate of lead being introduced into flour instead of alum, and very serious consequences resulted. Persons, I believe, are still living who suffered very considerably, in consequence of the poison being introduced into the system. With regard to bread, I may mention that it is sold to the poor very deficient in weight. Dr. Alfred Hill, lecturer on chemistry, of Birmingham, found quartern loaves, when sold, five, and six, and seven ounces short in weight. I have myself paid some attention to this subject, as it concerns the poor. One of those loaves which was deficient in weight, by evaporation lost nearly 50 per cent.; the alum could be tasted in it, proving that alum in bread enables bread to retain more water: 100 grains contained 3½ grains of alum. Now 100 grains of household bread, that is, bread without alum and without potatoes, lost by evaporation 41 grains; and 100 grains of baker's bread, of the best kind, containing alum, lost by evaporation 43 grains; another 100 grains of baker's bread lost 45 grains in weight. I may state that the majority of the inhabitants of a large town are not aware of the natural colour of bread. A bakery was established at Birmingham to supply the public with genuine bread; the company met with very great opposition from the public on account of that. They had to explain to people that bread was not naturally of a white appearance, but of a yellowish colour; and they had considerable difficulties in establishing their business.

2118. They sold pure bread, did they?—Yes, a bread which was very wholesome indeed. It has been stated here that alum is added to bread to give it a whiteness, and to enable it to carry moisture and to bear the addition of potatoes. I would state that the double addition of alum renders the bread more injurious, it being first put into the flour, and then some more being added to it by the baker. I have mentioned the effects of alum on the gums; I believe

I believe it has a pernicious effect upon the teeth; the gums shrink, and ultimately, with delicate persons, the teeth fall out. There are several trade names for alum; one of them, being very characteristic of its effects on the mucous surface, is "roughs," and another is "seasoning." With regard to potatoes in bread, gluten, the nitrogenous element of bread, is the element which makes the fibrine of the blood and the muscle, and contains nitrogen. Starch does not contain any nitrogen, and by adding starch, of course, the gluten is diminished, and the nutritive quality of the bread also. I have a statement here from a person who says, "I have lived seven years at Leicester with a baker and grocer, and have noticed the adulteration of bread there with both whiting, alum, and potatoes. I have fetched whiting and alum, and have mixed them with potatoes, and made it into bread with flour. After it had been worked with yeast into a sponge, this bread was sold at the same price as at other shops. My master bought nearly a ton of whiting at a time, and two or three cwts. of alum. He used the small round potatoes, which were boiled, unskinned, and then mashed in a tub; afterwards put on a sieve, water poured over them, and the skins separated. Then the alum and whiting were added in large lumps to the potatoes and water, and afterwards it was mixed with the flour which had been worked with yeast. It was then made into bread and baked. The potatoes made the bread work better; but if the alum and whiting were mixed with the flour before it was fermented, the bread was dark and heavy, one bushel or more of potatoes to a sack of flour used. My master had bread made for his family without alum, whiting, or potatoes; but all the bread sold contained these articles, which he told me he could not make bread without, and he ordered me to put them in. I lived at a baker's at a village in the Midland Counties, and they used the same articles in the same way. My master at Leicester used to mix starch with the arrowroot."

2119. *Chairman.*] What is the average quantity, as far as you can estimate, which you have detected in bread?—I should think one grain in 300 may be about the average.

2120. Do you consider such a quantity as that injurious to health?—I do certainly.

2121. One in 300 is not an exaggerated amount, is it?—It is a large amount certainly. Of course, the injurious consequences resulting depend very much upon the position and constitution of the individual. If the individual is a clerk or a literary person he will be more affected, having bad air to breathe and taking but little exercise; whereas, a strong, robust, country person would suffer less. But I conceive the repeated use of alum in bread by the inhabitants of large towns to be one great cause of dyspepsia.

2122. Mr. *Wise.*] Especially, I presume, that is the case with young children?—Yes; and it is the cause of the great consumption of purgative medicines.

2123. Can you suggest any simple means by which the public could detect alum in their bread?—By taking a slice of bread, crumbling and placing it in a basin, pouring over it a quantity of boiled rain water, and allowing it to remain some time, filtering the solution on pouring it off, and evaporating to dryness and then dissolving it again in a little more water, filtering the solution, and on adding a little ammonia or hartshorn, alum itself will appear shortly as a cloudiness in the fluid, and ultimately will subside to the bottom. I have been told that another practicable mode is, by introducing a hot knife into the centre of the loaf. If it adheres to it, it is a sign of the presence of alum.

2124. I have been told that good flour and good bread being of a spongy light character will hold a good deal more water if it is soaked in water than heavy bread, which is mixed with bean and pea meal, and articles of that description?—The bread made from alum is light and unsubstantial. It is stated by many persons who consume it not to be satisfying.

2125. Are you aware that in Paris the bakers are under the control of the executive, or, rather, of the municipal authorities?—Yes.

2126. Do you think we, with our constitution and habits, in England, could submit to such an arrangement, subjecting bakers and the inhabitants of a large town to supervision?—I think it would be exceedingly beneficial to the public; in fact, to such an extent has the adulteration of bread proceeded in this country, that positively men in the trade have sent messages to me, stating that they

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they would not be interfered with in their business; that they had introduced alum and potatoes, and they would continue to do it.

2127. Are you aware that there is an Act of Parliament at this moment by which a miller, or any person having improper ingredients for the purpose of mixing with flour, is liable to a penalty of 10*l.* for having those ingredients; and then he is liable to a penalty of 20*l.* for every sale he makes of the mixed article?—But you have no person to detect those adulterations. There is not an analyser appointed for the purpose of examining the bread, and the poor are entirely without remedy; they cannot employ an analytical chemist to test their provisions; the majority of persons are not aware that they are adulterated, and they consume them, though they may be injurious. For example, there are very few persons in the large towns who know that there is the quantity of alum in bread which actually exists. Latterly the matter has been elaborately investigated through the sanitary commission of the "Lancet," but those reports were almost sealed to the public till they have lately been made use of.

2128. As, from experience, we have found that people are generally unwilling to prosecute dishonest people in the shape of millers or bakers, you think it desirable that there should be some officer having the character of a public prosecutor?—I do think so; I think if there were some person whose duty it was to look after these matters, that would put a decided check upon the practice of adulteration. No doubt information would be furnished to the public prosecutor by private individuals.

2129. If we had a chemical inspector attached, either to a union or to a Board of Guardians, or to a Board of Health, or a Board for removing nuisances, you think he might investigate these matters, and enable some public officer to prosecute?—I think so. I have no doubt, if an officer were appointed by a public body, adulteration would be checked to a very great extent. The mere fact of such an officer existing would be sufficient to deter many men from adulterating. But till there is a proper officer appointed by the local authorities, and under some kind of control, not under the influence of the local parties, and a punishment is imposed upon the practice, you will have adulteration prevalent.

2130. The greatest punishment in that case would be the loss of custom, would not it?—I believe so.

2131. And publishing the name and the trade of the party, with his residence, would be a great preventive, would not it?—Parties who have been several times convicted of having short weights and measures, even so many as a dozen times, are not deterred from having those short weights and measures; but I would suggest that a punishment should be inflicted; not a mere fine, for then it becomes a matter of calculation whether it will pay the party to be fined, and to adulterate. A man who adulterates bread or other articles of food, I think commits a very great offence.

2132. Would you adopt the French system of suspending tradesmen for a time?—I think a distinction should be drawn between pernicious and harmless adulteration; harmless adulteration I would consider a swindle; but I think a person guilty of pernicious adulteration ought to be imprisoned.

2133. With a little hard labour, perhaps?—Yes, and the more educated the criminal, the greater should be the punishment. The practice of adulteration is a practice for the benefit of the party resorting to it at the expense of the purchaser.

2134. Mr. *Gregson.*] Would it not be desirable to make him eat his own bad bread in his imprisonment?—Yes, and leave him to reflect on its effects.

Veneris, 3° die Augusti, 1850.

MEMBERS PRESENT.

Mr. Moffatt.	Mr. Kinnaird.
Mr. Otway.	Mr. Villiers.
Viscount Goderich.	Mr. Scholefield.
Mr. Gregson.	

WILLIAM SCHOLEFIELD, Esq., IN THE CHAIR.

Charles H. Burton, Esq., called in; and Examined.

C. H. Burton, Esq. 3 August 1855.

2135. Viscount *Goderich.*] I BELIEVE you are aware that a patent was taken out in the year 1851, for forming chicory into the shape of coffee berries?—I am aware of the existence of such a patent.

2136. Will you have the goodness to state to the Committee the facts you know concerning that patent, and the nature of it?—It appears that in the year 1840 a Treasury Minute existed, which enabled chicory to be sold mixed with coffee without any restriction at all. Messrs. Duckworth, of Liverpool, it appears, took out a patent for certain improvements in the manufacture of chicory, and for compressing chicory into the form of berries or any other arbitrary form. I had occasion about the year 1851 to take a sample of those berries, and when mixed with coffee, although to any one well acquainted with the nature of roasted coffee, the difference might be observable, to the general public I do not think it would. They were in the form of coffee berries. I never saw them in any other form; whether they were compressed into other forms I am not aware. I do not think the machine was very extensively used; I am rather inclined to think that the patent did not yield a very large remuneration.

2137. The patent was taken out, was it?—It was taken out and enrolled in 1851. When your Lordship spoke to me upon the subject I went to the Enrolment Office and read the patent.

2138. The chicory you saw was compressed into the shape of coffee berries, and evidently intended to imitate coffee berries?—Evidently the berries I saw were intended to imitate coffee, and succeeded very well, I think.

2139. Mr. *Moffatt.*] You saw these imitations of coffee berries mixed with other coffee, I presume?—Yes.

2140. What proportion was there of false berries mixed with true coffee?—A very small proportion, I suppose; I have not minutely looked into that portion of the subject, but I should think a very small proportion, certainly not so much chicory as coffee.

2141. You believe that patent was a failure, do you?—I am inclined to think it was; it certainly was never extensively used. I do not think at any time the extent of mixing was so great as is practised in the ground state.

George Phillips, Esq., called in; and Examined.

G. Phillips, Esq.

2142. *Chairman.*] YOU are Chief Officer, I believe, of the Chemical Department, under the Board of Inland Revenue?—I am.

2143. Have you been for many years connected with that department?—Thirteen years.

2144. Will you be good enough to state to the Committee what are the articles which specially come under your supervision in the character of chemical analyst to the Board?—Beer, pepper, coffee, chicory, tea; soap did so until recently; tobacco, hops, spirits, sweets, that is, British-made wines, foreign wines, vinegar; and there are a variety of other things which come from the Customs, and sometimes from the Ordnance department, and various other Government departments.

2145. It is the duty of your special department, I presume, to examine those articles with a view to see whether they are or are not adulterated?—Precisely so.

2146. You have alluded to some articles of Customs, are there many such

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articles examined by you?—Many. If there is a dispute as to the proper nature of an article, and the duty to be paid upon it, that is sent to us to know what it is, and upon that report the Customs act.

2147. With regard to Customs articles, you do not so much examine the adulterations as endeavour to ascertain what the articles themselves are?—It is a question entirely between the trader and the Customs.

2148. Mr. *Villiers.*] Is it the case that an article is sometimes entered under one denomination, and it turns out to be another?—It is.

2149. *Chairman.*] Is there an extensive adulteration prevalent in the different articles which have come under your supervision?—Perhaps I had better read to the Committee a return I have for the last 11¾ years. It commences on the 30th of October 1843, and comes up to the present time. The summary is as follows: in the 11¾ years, 1,139 beer samples were examined; peppers, 1,116; coffee, 12,483; soap, 187; tobacco, 1,616; hops, 40; spirits, 105; sweets, that is, British wines, 47; foreign wine, 2; vinegar, 1; other samples, such as I have described from the Customs, and so on, 390; and tea, 142. The total number of samples examined, according to this return, is 17,268. In the peppers, 51 $\frac{6}{10}$ths of the samples sent up were found to be adulterated; coffee, 12 $\frac{9}{10}$ths; tea, 54 $\frac{2}{10}$ths; tobacco, 64 $\frac{1}{10}$th; hops, 87 $\frac{5}{10}$ths per cent. I should say that those hops were hops taken from the breweries; they were supposed to be adulterated, and they were sent up by the officers, and were examined.

2150. I understand you that all those samples which are suspected of being adulterated are sent to you?—Yes; our practice is this: the officers where they are located, if they suspect a trader of adulteration, go and procure samples. Even beyond that, many of them are competent to examine samples upon the spot, and they do so, as in the case of coffee and pepper; if they have any doubt of their own judgment, they take samples, and send them to the laboratory to be further examined. This is a return of the samples sent up under those circumstances.

2151. Mr. *Moffatt.*] Will you state the proportions of adulteration in the beer and other articles you have named?—We have beer sent up for the purpose of ascertaining the gravity at which it was brewed; that is, the weight of the wort; upon that weight the drawback is allowed.

2152. Mr. *Villiers.*] As it comes from the brewery?—No, from the vessel, when it is about to be exported.

2153. There is a drawback, is there, on the beer which is exported?—Yes; it is averaged to meet the malt, and according to the strength of the beer, so is the drawback; a large number of those samples were samples which were sent up under those circumstances. There were only 12 samples of beer out of that large number which were proved to be adulterated; when those samples pass through our hands we not only ascertain the original gravity of the beer, but if there was anything peculiar in the beer we should also make an examination of it.

2154. What particular purpose would the Board of Inland Revenue have in doing that?—We should proceed against the brewer.

2155. It is with the view to check fraud on the payment of the duty on malt?—The officer sends them up for us to ascertain the gravity of the beer; if we found the beer to be adulterated we should take steps against the brewer to detect and punish him.

2156. *Chairman.*] On grounds quite distinct from the question of drawback?—Yes.

2157. Mr. *Moffatt.*] Have you found much adulteration in soap?—That has passed from our hands at present; the chief thing would be impurities in the shape of sulphate of soda and a variety of things of that nature, common salt and so on.

2158. Do you know the number of adulterated samples?—No, I have no return of that kind; with respect to beer, out of the large number of samples there were only 12 which were supposed to be adulterated, and they all turned out to be so.

2159. Mr. *Villiers.* Do you make any inquiry as to the quality of beer for home consumption?—No, the strength of beer we have nothing to do with, if the beer is pure.

2160. What is the nature of the informations we see laid against publicans for putting in grains of paradise, for instance?—They are against brewers; most of the 40 samples of hops I have spoken of contained grains of paradise; in one instance we had cocculus indicus, but only in one instance.

2161. That has been found at a brewery?—At a brewery, and there was one instance of there being tobacco.

2162. You do not search for it, and you do not notice it when it is in the hands of retailers?—Unless we had a suspicion we should not examine a person's beer. We have a force, called the Detective Force, to look after those things, and if they suspect a publican of adulterating his beer we should examine his beer. We have had several cases of mixtures, which have been found in the publican's possession, for the adulteration of beer.

2163. They are not bound to brew of a certain strength?—No, they may brew of any strength they please. It is chiefly sugar, common salt, and sulphate of iron that are used for adulterating beer, and also quassia. The officers' practice is to go down and examine the cellars of the publican; they go and examine the beer at such times as they may think most likely to detect anything that is wrong; sometimes they succeed in finding those mixtures, or they may find the man in the act of mixing the beer.

2164. What is the offence to the revenue?—We charge for the loss of duty; they are robbing us of the malt and hop duty.

2165. They have a right to sell what they please, have not they?—Yes, provided it goes into their possession as beer; but when they put those mixtures they also add water to it; the object of this mixture is to enable the publican to make a larger quantity of beer, to make 100 gallons, for instance, 150.

2166. His customer may drink it and prefer it?—He may.

2167. It is against the tenor of the licence to adulterate the liquor he sells, and so far the Excise might inquire into it if they grant the licence; but how is it an offence for a man to keep a mixture in his cellar, if his customer chooses to buy it?—The law forbids it; he has no right to have possession of those things.

2168. Mr. *Moffatt.*] He has no right to have possession of porter mixed with water; that is, water added to the porter?—That is forbidden.

2169. How can you detect whether water is added?—We can do that; it brings the beer to a lower standard.

2170. Mr. *Otway.*] Do you in all cases lay an information when you detect those adulterations?—Yes, invariably.

2171. *Chairman.*] Have you any account of the number of informations which you have laid?—I have not; this number would not represent the number of informations, but the number of samples; it is possible that one trader might have had 10 samples in one case.

2172. Mr. *Otway.*] What is the penalty imposed upon a publican for adulteration?—The fine for mixing beer, I believe, is 200 *l.*, but I am not very well acquainted with the law.

2173. Have convictions in most cases followed the informations laid by you?—I think it is a rare thing that we lose a case, not one out of 200 or 300.

2174. Mr. *Villiers.*] When they are brought to you they are suspected, are they not; you do not direct your officer to go out and bring you samples promiscuously, do you?—Yes, that is frequently directed by the Board; a trader may be thought to be selling something which is impure; in that case instructions are sent down to the supervisor to take such measures as he may think necessary to detect the fraud.

2175. Is there a staff of chemical officers belonging to the Board of Inland Revenue?—There is.

2176. *Chairman.*] How many are there in the department?—In my department there are six; we have already about 60 or 70 well educated men for the United Kingdom.

2177. They are not all resident in London?—No, they are stationed at the outports, and at various places where they are thought to be most usefully employed.

2178. Mr. *Moffatt.*] Are those officers educated as analytical chemists?—Yes.

2179. And you would have confidence in their reports?—All that I know I have reason to be satisfied with.

2180. How many students have you at University College for the purpose of studying with a view to become officers under the Excise?—Fourteen every year.

2181. Mr. *Otway.*] The first information you get concerning adulterated beer comes to you from the customers of the adulterating publican, does not it?—We do receive information from customers, but the chief part of our samples are

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procured by our own officers; if a man is suspected it is the duty of the officer to look after him.

2182. He could only be suspected upon a report of one of his customers, could he?—It might be one of his customers.

2183. Mr. *Moffatt.*] Or a rival in trade?—Yes, it might be a rival in trade.

2184. What per-centage of adulteration have you found in the samples of spirits you have examined?—I have not a return of what the spirits were composed of. With respect to coffee, as the law stands at the present moment, a trader can sell a mixture of chicory and coffee provided he prints on the package, "This is sold as a mixture of chicory and coffee." When a person asks for genuine coffee the trader is held responsible that the article shall be genuine. In this return a great many of the samples were bought as mixtures; some were bought as genuine.

2185. Mr. *Villiers.*] It was no offence if it was a mixture?—Provided he complied with the law, and had it legally printed upon the outside of the package, "This is sold as a mixture of chicory and coffee;" and that it stand alone, so that it shall catch the purchaser's eye.

2186. *Chairman.*] Is not it sometimes the case that he puts the notice in such small letters, or on such part of the package that it would not attract the notice of the purchaser?—Then we should proceed against him.

2187. Mr. *Moffatt.*] Are you aware of any general infraction of that regulation?—Yes; it is either folded under the package, or perhaps mixed with some other printing; in that case the trader is proceeded against.

2188. That is an evasion of the regulation, and he is liable to be proceeded against?—He is.

2189. And he is proceeded against?—He is.

2190. Mr. *Villiers.*] You say you have received packages containing this mixture; those were packages without the label, I suppose?—The label was either imperfect, or some regulation was not complied with.

2191. *Chairman.*] How many cases of that kind have there been?—The total of the coffee cases was 12,483; the chief of those have been from the 30th of October 1852 up to the present time. From the 30th of October 1852 inclusive, to the 29th October 1853, there were examined 5,276 samples; of those there were purchased as coffee, 3,378; 2,890 were found genuine and 488 adulterated. The number of mixtures purchased in that year was 1,898; 904 were found properly labelled; 283 not labelled at all; and 19 were found to contain other substances than chicory.

2192. What were the other substances?—I cannot state without referring to the book; if the Committee wish, I can forward them a statement. From the 30th of October 1853 to the 29th of October 1854, 4,642 samples were examined; of those, 3,434 were represented as genuine, and, on examination, there were found to be 2,910 genuine, and 524 adulterated; of the mixtures, 1,208 were purchased; 882 were found properly labelled, 265 improperly labelled, and 61 not labelled at all, and no other substance than chicory was found in them. From the 30th of October to the 30th of July 1855, 2,530 samples were purchased; of those, 2,069 were purchased as genuine; 1,954 we found to be genuine, and 115 adulterated; of the mixtures, 461 were purchased; 436 were found properly labelled, five improperly labelled, and 20 not labelled at all, and no other substance was found in them; the chief part of the coffee samples, therefore, have been within the last $2\frac{3}{4}$ years.

2193. Is there a great difference found in these various packages as to the proportion of chicory to coffee?—Very great; I can give you the per-centages for the year, from the returns I have just read. In 1853, the average per-centage of chicory was 20·41; in 1854, the average per-centage was 16·75; for the three-fourths of the year, up to the end of last July, it was 17·87.

2194. Do you know of any practices for the purpose of evading this regulation of the Excise, such as, that if you do not ask for genuine coffee you get the mixture?—The invariable practice in the trade, I believe, is this; if a person asks for coffee, he is pretty sure to have the mixture of chicory and coffee; we do not hold the trader responsible unless he is asked for genuine coffee.

2195. Viscount *Goderich.*] If a person goes into a shop and asks for coffee, you do not hold the seller responsible if he gives him the mixture?—No; but if he sent it out unlabelled we should hold him responsible; if he sells the mixture and sends it out in plain paper we should proceed against him.

2196. To get pure coffee you must ask for pure coffee?—Yes.

2197. Mr. *Villiers*.] Upon what principle is it, that if people ask for anything so distinct as coffee, it is sanctioned by the Excise that traders should sell something so different as these mixtures?—For this reason: if you trace the history of chicory you will find that, prior to the year 1832, we had heard nothing of the use of chicory in this country; it had been gradually going on for some years, but by insensible degrees, till in the year 1832 it had arrived at such a height that the Board proceeded against a trader in Liverpool. This proceeding was stopped by an Order of the Treasury. Then there was a Treasury Order not allowing the mixture of chicory with coffee. That went on till the year 1840, when steps were again taken to prosecute a party, but were annulled by the Treasury by an Order of the 31st August. From that period we have gone on allowing persons, till recently, to put chicory into coffee. Now, the regulation I have named is that they must state that it is a mixture. I can only account for the fact, that when a person goes into a shop and asks for coffee he is supplied with chicory and coffee by the practice of the trade.

2198. Surely you would never get any ordinary consumer of coffee to consent to such a proposition as that; does the public know this rule of the trade; is it stuck up in the window that if they ask for coffee they will get chicory with it?—No; we allow this indulgence to the trade, if they comply with our regulations.

2199. But that is no protection to the community?—We think that every man in this country is now pretty well enabled to read and write, and as we insist on the words being legibly printed, we think the purchaser can have very little trouble in securing himself, if he think proper to do so.

2200. Is that principle recognised in the case of any other article?—No; if you ask me to defend the principle, that a man should be liable to have one thing given him when he asks for another, I cannot do so; I can only explain it by saying it is the custom.

2201. We are asking about the regulation of the Excise?—I do not understand the object of that regulation, which says that people may sell chicory when they are only asked for coffee?—The Board of Inland Revenue act under the Treasury; they have the authority of the Treasury, and they can only go as far as the Treasury allows them to go in the matter. The Treasury say, "We allow this mixture, provided you adopt these regulations." The Board have done so.

2202. The inquiry, therefore, which we are now making, must be made of the Treasury?—Yes; we are not responsible for the Treasury.

2203. Mr. *Moffatt*.] You act under an express Treasury order in this behalf?—We do. I may say, with regard to chicory, I have no doubt from my own experience, that a very large bulk of the public prefer the mixture; that, however, is a question of taste.

2204. Mr. *Villiers*.] They would have no objection to mix it themselves probably?—That is a difficult matter for a poor person; it is more convenient to him to have the mixture made for him. The trade contend that good coffee, mixed with one-eighth part of chicory, and sold at a moderate price, makes a better beverage than ordinary coffee would do at the same price, and the great mass of the public prefer it.

2205. Chicory sold as coffee yields a certain profit to a man who is paid for coffee?—Yes, no doubt of it, but probably it equalises itself in the general competition of trade. There is a large quantity of chicory sold by itself, and drunk as a beverage in the neighbourhood of Manchester and Liverpool.

2206. Mr. *Otway*.] What is the difference between the price of a pound of the cheapest kind of coffee purchased by the bulk of the poor people, and a pound of mixture?—I believe that it is about the same price.

2207. Then obviously the trader gains the difference?—The trade deny that. They say, where we use a portion of chicory we use a better coffee; that is the position of the trade. I do not know the fact of my own knowledge.

2208. *Chairman*.] You have positive means of judging of the prices paid, have not you?—Yes, we always have the prices sent up.

2209. The result of those inquiries is, that the price of the mixture is, generally speaking, the same as the price of the pure coffee?—Yes, generally as to the lower descriptions. We have had cases out of the number I have spoken of which were purchased as genuine, but were found to be adulterated. In those cases the price was precisely the same as if you asked for genuine coffee.

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2210. Mr. *Otway.*] Have any officers of your Board discovered the fact, that the coffee sold in mixtures is of a superior quality to the coffee sold as a pure article?—That would be very difficult to ascertain; it depends upon the question of taste and aroma.

2211. Have you any other proof of the fact than the statement by the trade, that they introduce into the mixtures a superior kind of coffee?—We have no proof whatever; we have only the statement of the traders.

2212. Mr. *Villiers.*] Do you find chicory always pure?—No.

2213. How is it adulterated?—I have found the following articles in different samples of chicory; beans, rye, oats (roasted and ground), caramel, that is burnt sugar, red oxide of iron, orange berries; orange berries were used a few years ago, though I have not noticed them lately, in the neighbourhood of Manchester, where chicory was really drunk as a beverage alone.

2214. In what proportions have you found this admixture with chicory?—Various proportions; in one case at Manchester those substances formed from 50 to 70 per cent. of the weight of the mixture.

2215. Do you suppose that this adulterated chicory is mixed with coffee?—I know it was in this case; I had some of the coffee with which it was mixed.

2216. Have you ever found any difference in price between pure chicory and chicory so mixed?—I believe this was something lower in point of price; the case I am speaking of occurred some years ago, when chicory was worth more than it is now; it was an object for them then to introduce those substances.

2217. Is chicory largely imported?—No, not now; it is grown in this country.

2218. *Chairman.*] Have you any power to inflict penalties upon persons for adulterating chicory?—We proceeded against those parties and convicted them.

2219. Is there any power of imprisonment?—If they do not pay the penalty we should probably proceed to extremities with them.

2220. Mr. *Moffatt.*] You stated that the public generally, in your belief, prefer a mixture of chicory and coffee to pure coffee?—That is my belief, and that is the assertion of the trade.

2221. Is that belief derived from the reports of your officers throughout the United Kingdom?—It is from the best information I can gather on the subject.

2222. Have you given a great deal of attention to this subject?—I have.

2223. Mr. *Villiers.*] To the taste of the public?—No, to the mixture of chicory and coffee; it is a mere matter of opinion.

2224. You do not particularly inquire whether the public like chicory or not, do you?—I cannot help hearing observations made.

2225. Mr. *Moffatt.*] Do those observations generally produce the belief in your mind that the public do prefer a mixture of chicory and coffee to pure coffee?—They produce that impression upon my mind.

2226. Mr. *Villiers.*] And there is a profit in selling chicory for coffee?—Provided they sell it at the same price; but I believe as a rule the price of the mixture is in proportion to the quantity of chicory present, and the value of the coffee used. You may give as much for a pound of coffee which contains 12 per cent. of chicory; in fact, more than for a pound of pure coffee. You will buy a good deal of coffee mixed at 1*s.* 6*d.* a pound, if it is a fine coffee, and you may buy pure coffee at 1*s.*; though the coffee mixed may contain 12 or 13 per cent. of chicory. The grocers contend that one-eighth is a proper proportion, and I believe that from my own experience.

2227. Mr. *Moffatt.*] Did you ever drink coffee mixed with chicory?—I always drink it.

2228. Do you prefer it?—I do.

2229. You find nothing injurious to your constitution in it?—Certainly not.

2230. You prefer it as a matter of taste?—I do.

2231. Consequently you consider it an accommodation and an advantage to the public that the vendors of coffee should be allowed to mix chicory with their coffee?—I think so.

2232. Viscount *Goderich.*] Provided always they do not sell it at the same price as pure coffee?—I think the price is a matter you must leave to the public; it always regulates itself.

2233. Mr. *Moffatt.*] Is not it quite possible that a vender of coffee shall sell a coffee which costs him 1*s.* 6*d.* a pound, and shall put into that coffee one-eighth of chicory?—Yes.

2234. Consequently,

2234. Consequently, the coffee will cost him a higher price than if he had sold pure coffee which only cost him 1 *s.* a pound?—Certainly it would.

2235. The trade continually state it to be the fact, that they do use a higher description of coffee, which they can mix most advantageously with chicory?—Yes.

2236. *Chairman.*] Is not it quite as possible that a man may mix chicory to the extent of one-eighth or one-fourth with common coffee?—I think not. It is deficient in aroma, and the principle which would disguise the chicory.

2237. Are you of opinion that such an admixture would be found out by an ordinary drinker of coffee?—I think any one possessing any degree of perception in taste would soon notice the thing. I am not now speaking of the very lowest of the people, who would drink almost anything; because what can one imagine more gross than chicory by itself; and yet that was drunk in the neighbourhood of Manchester some time ago; but I think the middle classes would detect the difference.

2238. We are taking into consideration very much, if not especially, the interests of the lower classes in this inquiry?—I do not think the lower classes would detect it.

2239. Mr. *Moffatt.*] It is your opinion that the mixture of chicory with the lower sorts of coffee would not please the palate of the public?—It would not please me, that is all I can say.

2240. Mr. *Otway.*] I presume it is somewhat troublesome, is not it, to make this mixture?—They grind it in; that is one of the statements of the grocers, that it is very important to a successful issue in making their coffee that it should be well ground together, and they contend that you cannot so well make it without that.

2241. The coffee seller, you think, takes all this additional trouble in grinding and mixing, and then incurs a loss, or derives no profit from what he sells, merely for the gratification of his customers?—I have not said that; I say, if you use chicory you must use a better description of coffee with it in order to pass with a certain class of people; I do not imagine that a dealer does not take care to realise a profit upon the mixture.

2242. The question is as to the degree of profit. If you sell a superior sort of coffee, and mix a certain quantity of chicory with it, you say that the vendor of that article does not derive a profit, because he has given the purchaser a better sort of coffee; in addition to that, he has taken the trouble of grinding and mixing, and yet derives no additional profit?—I do not think I have said anything of that kind.

2243. Mr. *Villiers.*] I take for granted that it makes no difference in the character of the offence; the chicory not being very injurious; the Excise officers are quite as vigilant in detecting this kind of fraud as if the chicory were deleterious?—Quite the same; ours is a question of revenue, not of health; sugar is as injurious to us as arsenic when mixed with tobacco.

2244. You have given an opinion as to your own taste, and as to the character of the mixture; that has nothing to do with the offence as regards the Excise?—It has not.

2245. Your officers are directed to watch the thing quite as rigidly, notwithstanding the taste of certain members of the Excise as to the mixture of chicory with coffee?—Certainly.

2246. *Chairman.*] I understand you to say that you yourself prefer a mixture of chicory in your coffee?—I do.

2247. Do you prefer having the mixture made by the grocer, or do you make it for yourself?—I always make it for myself.

2248. If an ordinary purchaser of coffee goes into a shop and asks for coffee, and is served with a mixture of chicory and coffee, may not he get in that mixture a proportion varying from 20 or 50 to 75 per cent. of chicory?—He may; we once found 95 per cent. of chicory, but I think that must have been a mistake; I think some coffee must accidently have fallen into the chicory; we have had it from one per cent. upwards.

2249. Mr. *Villiers.*] How was that package labelled?—I think it was sent out as a mixture; I think it would have been too gross to have been sold as coffee.

2250. It would have been legal?—Yes.

2251. If the person had asked for coffee he would have got 95 per cent. of chicory

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chicory and five per cent. of coffee, because he asked for coffee, and that would have been legal?—It would have been legal.

2252. Did you not say you could not give the Committee any information about spirits?—The return of spirits I find not to be stated. In the cases which came to us it might not be a question of adulteration, but of strength.

2253. Have not you peculiar means of ascertaining when spirits are adulterated? We can always ascertain it.

2254. We have had evidence here to the effect that a mixture or adulteration is invariable in all public-houses; what is the course adopted with a view to detecting those practices?—The fact is, we have abandoned what is termed stock-taking of the retailers. The trade is thrown open and they are left to do pretty much as they like; at the present moment, so far as stock-taking is concerned, we have power to take their stock if we think proper; the goods are sent in with a permit, and the trader enters them in a book, and when the officer goes he takes up this document representing the receipt of a certain spirit, and if we think proper we can take the stock.

2255. Is not the revenue defrauded in this way. You were mentioning what extraordinary vigilance is shown as to the export of beer to be certain that they do not get more drawback than they ought. Every glass of gin which is mixed with water and sold as gin is a loss to the revenue, is not it?—I think not. If the public wished to drink gin at 50 per cent. under proof the retailer could have it sent in to him. The law prohibits him from putting anything to it himself. He is not allowed to add sugar and water to his gin; it is an act of compounding which we do not recognise.

2256. The duty is not paid on gin and water?—No, it is paid on the spirit. Suppose, for instance, the publican buys his gin at 17 under proof, that is, in every 100 gallons of proof spirit 17 gallons of water. That may be too strong for ordinary taste, and therefore the publican when he gets it in at that strength reduces it probably. I cannot say he does so from actual knowledge, but we may suppose that he does so. If you were to interfere with the retailer as regards the reduction of the gin, the retailer must fall back upon the wholesale dealer, and have it ready made up to the strength he requires, sweetened and all. I do not think we should gain anything by that as a question of revenue.

2257. I suppose it is not mixed merely for the gratification of the consumers; it is with a view to profit, and I presume a man pays more than he ought to do when he drinks gin and water, ready prepared as gin?—I think that is a question which the public will always put right themselves. If they do not like one man's gin they will go to another whose gin they prefer.

2258. If a man drank what he paid for, which is gin, would not the revenue profit by it. He thinks he pays for what is pure, and if he drank what was pure the revenue would have the benefit of it, would it not?—The term purity I understand to have reference to water only. That only comes back to what I say, that the public will pay a certain price, and will have a certain article; if the retailer has not that article in a state to deliver to his customers, we will suppose he makes it so; and we will suppose that that is an infringement of the Act of Parliament; but if that were put a stop to it is not a question of revenue; we should derive nothing from it; the retailer must then go back to the wholesale dealer.

2259. The Committee understand you to say, that if there were any means of preventing this sort of mixture, which takes place before it gets to the consumer's lips, the revenue would not benefit by it at all?—I cannot see that it would at all.

2260. You say, I understand, that with respect to beer that would not quite apply, because if they consumed the malt which is supposed to be in the amount drunk, the revenue would benefit by it?—Yes; the question is this: as to the strength of spirits the public like to drink in the shape of what is termed neat spirits. I do not think they drink it strong; I should think the average strength of gin is in London from 40 to 50 under proof, and it is purchased from 18 to 20.

2261. Mr. *Moffatt.*] Is it your opinion, that if the retailer were compelled to sell it at proof there would be as much gin drunk as there is at the present time?—I think it would be a highly immoral and injurious thing; I think it is far better for them to drink weak gin and water than strong; I think the question of strength is just a question of price.

2262. Mr. *Villiers.*] Does that account for the differences of price one sees charged in different shops?—I should say so.

2263. Mr. *Moffatt.*] The different degrees of competition, I suppose, might account for the difference of price in this as in every other article?—Yes, there is no doubt that competition in the retail spirit trade, like all other trades, reduces the profit to a pretty equal amount.

2264. Mr. *Villiers.*] What is the difference between this article and any other? There is a great deal of vigilance shown apparently by the Excise for the purpose of detecting certain kinds of mixtures. The answer given by those who defend the system is, that the public have a positive preference for them. You inquire into the fact of these mixtures for the purpose of revenue, you say. You have certain packages sent up to you to ascertain if they are mixed with other things; what is the difference between spirits of which you have given us no account at all, and all the other articles which you have given us an account of as having examined them, and found there are ingredients which are not professed to be sold, and having proceeded against the party selling them?—I will endeavour to make it as clear as I can. Pepper pays a duty of 6*d.* per lb. and 5 per cent. I have had cases in which 90 per cent. of foreign matter has been mixed with a sample of pepper. It is clear as a question of revenue we lose considerably upon that. But when you come to spirits we must define what is meant by a mixture. If we go back to absolute alcohol, and trace it down till it comes into the hands of the publican, we shall find that one man drinks his brandy no stronger than the poor man drinks his weak gin; you must therefore define the amount of strength at which the retailer is to sell it; and I think that would be a great hardship upon the trade; I think it is far better to leave it open to the public to correct all those little differences of opinion.

2265. Whether it is pepper or gin?—I contend that water is not an adulteration.

2266. Supposing pepper is mixed with brickdust, which must be nearly as cheap as water, what is the difference between the mixture of gin and water, and pepper and brickdust?—Supposing a man could drink one pint of absolute alcohol in a day, and that is as much as he could manage; supposing he was to drink that in a strong state, it would be poison to him, and he will bring it down to the state in which he can drink it; however you may confine him to any particular strength, if he drinks more than that, it will knock him up. If he drinks any number of glasses of gin of a certain strength, they may contain only as much spirit as he has been used to; if he takes 10 glasses of gin, he may take as much spirit in those 10 as in double the number.

2267. You visit various places to ascertain if articles are mixed with other things; and one would think you had peculiar facilities for ascertaining whether spirit is adulterated or not?—We do not look upon water as an adulteration.

2268. *Chairman.*] In what way do you levy the duty on spirits?—Upon the proof gallon.

2269. Then there is a standard?—Yes; but no man could drink proof spirits. There is no difficulty in arriving at the strength of any spirituous mixture; no matter whether it contains sugar, or whatever you think proper to mix with it, we can give you the exact quantity of the spirit present. I do not think the admixture with water afterwards affects us at all.

2270. Viscount *Goderich.*] The distinction you drew just now between the mixture of spirit and water and pepper and brickdust is this, that a person could not drink proof spirit without water being mixed with it, whereas he might eat pure pepper without the mixture of brickdust?—Yes.

2271. Mr. *Villiers.*] We have heard evidence that the gin is first reduced by water, and then sundry things are put into it for the purpose of giving it strength. As far as I understand your argumentative answer, it is this, that the person only drinks the thing which is palatable, or which his stomach enables him to drink. But does not it show that he has a taste for something stronger than what should only be sold as gin and water, when we find people put in these other ingredients?—There you suppose a case in which a trader has reduced his gin with water, and endeavours to make it up stronger than it is by putting in something else.

2272. Yes?—That would be adulteration.

2273. Does not that show that the man has a taste for something stronger?—I apprehend that when a person goes into a gin-shop to have a glass of gin, he gets what he likes; or, if he does not, he will not go there a second time.

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2274. *Chairman.*] Do not you think I should be injured if I were to go and purchase gin at a publican's; I generally purchase my gin at the distiller's. If I go to the publican, I ask for something under the same name, and he sells me an article which is only half as strong as that I have been in the habit of purchasing; is not that an injury?—The question would be, do you pay the same price for half the quantity of alcohol; I apprehend not.

2275. That is not a question I can answer; I go to buy gin, and I do not expect to buy gin and water?—It is all gin and water which is sold.

2276. Is it gin according to the standard of the distiller?—The distillers have no standard.

2277. But you have?—You may go to a rectifier, and buy your gin 90 under proof, or the like; they sell cordials at that strength, and they are compounded.

2278. Mr. *Moffatt.*] Is not the question of strength and price purely a question between buyer and seller?—I think so; I think water should not be regarded as an adulteration of spirit.

2279. *Chairman.*] The only adulteration you would notice is the admixture of certain articles intended to give a strong flavour to gin?—Yes, or injurious to health.

2280. Mr. *Otway.*] You do not object, I understand, to adulteration with water, because you say it suits the palate of the customer?—That is my opinion.

2281. You say the consumer is satisfied with what he buys, or he would not come back to the same place?—Yes, I think that is a fair inference.

2282. Is not it your opinion that the consumer may be taken in in this way; that some palatable taste may be produced in it by the introduction of very deleterious matters?—It is quite possible.

2283. Viscount *Goderich.*] That you would consider an adulteration?—Yes, and we should proceed against the party if we found it out.

2284. You would consider it an adulteration so to reduce spirit by water, that you were obliged to add certain stimulant matters to it to bring it up to a strength which suits the public taste?—Yes; if we found something which was quite foreign to the gin itself we should have a fair case against the man for adulteration, or the possession of an article for the purpose. A case occurred some few years ago of this kind. A gentleman in the north of Ireland who drank his 14 or 16 glasses of toddy in an evening became very ill from drinking it. He would persist in the belief that it contained corrosive sublimate; he sent us up a sample. We examined it and it was perfectly pure, and we found the whole mischief arose from the quantity and not from the quality of the spirit. I am afraid that is the case with gin. People drink too much, and then complain of the quality of the article.

2285. *Chairman.*] Have you heard of cayenne pepper being mixed with gin?—I have heard so; it could be detected, of course.

2286. Mr. *Villiers.*] Will you send the Committee a return with respect to spirits?—I will look and see what the samples relate to. If I were asked, "What is the strength of the spirit, and what it contains," my analysis would be made to answer these questions. The strength of the spirit would be ascertained, and the quantity of sugar or colouring matter it contained, and if any deleterious substance was suspected I should endeavour to detect it, but I do not remember a case of the kind.

2287. Have you never had any evidence of the adulteration of spirits during the 12 years you have spoken of?—I do not recollect a case.

2288. This is a matter which can be ascertained precisely, cannot it?—Yes, the Committee can have a full account of what has taken place.

2289. Can we have the same kind of return with respect to spirits that you have given us with respect to coffee?—I can give you the return here; I cannot tell you what the cause was that those spirits were not allowed. The heading of this return is, "Total number of samples found to be as stated:" the total number of samples examined during the 12 years was 105 samples; out of that number 73 were found to be as stated and 32 were not.

2290. What is the meaning of "found to be as stated;" can we ascertain what they were stated to be?—I cannot answer the question; I do not know what they were sent up for; probably it might be a question of strength in the distiller's stock or in the spirit dealer's stock.

2291. Will the account of the spirits which you are going to give us distinguish

guish between different kinds, such as brandy, gin, whiskey, and so on?—Yes, all the particulars will be stated.

2292. Is brandy never adulterated?—If you view colouring matter as adulteration, it is always adulterated.

2293. Do you know if it is ever reduced with water and then made stronger by the introduction of other ingredients?—I cannot speak to the use of other ingredients; I have no knowledge of what a particular trader may do.

2294. Mr. *Moffatt.*] Am I to gather from your evidence that you can inform the Committee that gin is made stronger by other ingredients?—I am not aware of it.

2295. Mr. *Villiers.*] The evidence which has been given before the Committee, therefore, has not reached the Excise yet?—I have not seen it.

2296. How does foreign wine come within your province to examine?—I cannot tell; we have had two samples, one in the year 1850, and one in 1852.

2297. Are there any tasters appointed for the wine brought into this country?—We have none.

2298. Mr. *Moffatt.*] The wine is under the Customs, is not it?—Yes, and the dealers have to pay a licence to us.

2299. Mr. *Villiers.*] Are British wines much adulterated?—British wines are made up in a variety of ways; we do not interfere with them much: it is presumed that they will not produce more than 12 per cent. of proof spirit by fermentation; we get samples to ascertain what is the quantity of spirit present in them, and whether it is a cordial or not.

2300. What is the case with respect to vinegar?—There is no duty on vinegar, and we have little or nothing to do with it now.

2301. Mr. *Moffatt.*] When there was a duty on vinegar, was it much adulterated?—The law allowed a small per-centage of sulphuric acid; I am not aware that it was adulterated beyond that.

2302. Mr. *Villiers.*] What information can you give us respecting malt?—The fact is, we have been in some difficulty about that, and I believe we have now arrived at a means by which we can detect any mixture. It is possible we may have been defrauded of malt duty by the mixture of grain; some traders assert that we have largely, but I cannot say of my own knowledge.

2303. What would be the nature of the mixture?—Chiefly barley, I suppose.

2304. *Chairman.*] Have you any information to give the Committee with respect to hops?—Hops are charged with duty at the planter's. The return I have given here is with respect to hops which have been used in brewing beer; it appears that for six years we never had a sample forwarded. In 1843 and 1844 there were only two samples sent, which were found to be adulterated; from that period up to the 30th of October 1850 we received nine samples, the whole of which were adulterated; from the 30th of October 1851 to the 29th of October 1852, we had eight samples sent up, one of which was genuine, and seven were adulterated; from the 30th of October 1852 to the 29th of October 1853 we had five samples, all of which were found to be adulterated; from the 30th of October 1853 to the 29th of October 1854 we had five samples sent up, two of which were genuine and three adulterated; from the 30th of October 1854 to the 30th of July 1855 we had eleven samples sent up, two were found to be genuine and nine were adulterated: these substances have been found in hops; cocculus indicus, grains of paradise, quassia, chiretta, gentian, camomile flowers, coriander seeds, and, in one instance, exhausted tobacco.

2305. Mr. *Moffatt.*] Have you the per-centages of any of those articles which were found?—No.

2306. Was the amount considerable?—The substance we have most generally found in used hops is grains of paradise.

2307. Is that prejudicial to the consumer who takes it?—No, it acts merely as pepper.

2308. There is nothing prejudicial to the public health in that article?—Nothing whatever.

2309. Mr. *Villiers.*] Were you educated as a medical man originally?—No.

2310. Perhaps you only give that opinion from hearsay therefore?—No.

2311. Mr. *Moffatt.*] You know the properties of grains of paradise, I dare say?—I do; cocculus indicus is a strong poison: I nearly poisoned myself the other day in working upon a sample for a case I had.

2312. What is the advantage of using cocculus indicus?—They say it is used

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to produce intoxication, but I do not believe it will do so; it does not do so with me.

2313. Have your officers a right to enter breweries?—Yes; the two substances highly objectionable here are cocculus indicus and tobacco; it is impossible to say what would be the effect of these taken internally.

2314. *Chairman.*] You have no doubt, I presume, that grains of paradise are an improper adulteration?—We do not recognise it; the use of grains of paradise is this: when a brewer uses a bitter such as quassia, which is the most persistent and cheap bitter he can use for brewing purposes; if it were used alone in any perceptible quantity it would dwell on the palate, and any one would know that it was not the bitter of the hop; but if they use quassia and grains of paradise together, the biting property of the grains of paradise on the palate disguises, to a certain extent, the perception of the bitter; we view that as a fraud on the revenue.

2315. It is a fraud on the public also, is not it?—Yes.

2316. Mr. *Villiers.*] Are they subject to penalties for such ingredients being found on their premises?—Yes, we have prosecuted many.

2317. Mr. *Otway.*] Brewing takes place only at one season of the year, does it?—All the year through.

2318. Take such a brewer as Messrs. Allsop or Mr. Bass; is not their brewing time generally in October?—They brew particular qualities of beer then for keeping.

2319. I have heard that they have a much larger number of men in their employ then than at other periods?—It may be so.

2320. Are the visitations of your men arranged with the brewers, or do they go just as their inclination or discretion suggests?—They have power to enter the brewer's premises at any time they think proper; in practice, I think, they visit once a fortnight, and then there is the chance of the supervisor going in also.

2321. Is information given to those great brewers beforehand; is it customary to send round a notice that on such a day it is probable a visit will be made?—If the officer did that he would be immediately discharged for it.

2322. He comes in without any warning at any period of the year?—That is his instruction.

2323. Mr. *Kinnaird.*] Day or night?—From five o'clock in the morning to 10 o'clock at night he can go in by himself; after those hours he must have a peace officer with him.

2324. Mr. *Otway.*] Does he make a return of what he observes?—Yes; every brewer must enter every brewing of malt under a penalty. The officer is enjoined to go there within so many days, and he takes the original entries and makes a transcript of them, and signs this paper; the supervisor does the same; he is the checking officer; he should go independently of the officer, and visit any trader he thinks proper without the knowledge of the officer, and we suppose that he does so.

2325. *Chairman.*] Did you ever find strychnine in beer?—Never.

2326. Mr. *Villiers.*] There was a notion some time ago that there was strychnine in pale ale?—I believe there was no foundation for it.

2327. Mr. *Otway.*] There is a large quantity of strychnine brought into the country every year, is not there?—I do not think there is; I know when I want any I have frequently to send to Paris for it.

2328. Mr. *Moffatt.*] Do you know how many hundred weights of strychnine are imported into the United Kingdom in a year?—I do not know.

2329. Mr. *Villiers.*] Have you anything to do with soap now?—No.

2330. It used to be subject to the Excise?—Yes.

2331. Is the whole of the duty taken off?—Yes.

2332. It used to be a good deal adulterated, did not it?—There might be common salt and sulphate of soda; some persons would try to increase the weight or volume of the soap; but I do not think, generally speaking, adulteration was largely resorted to.

2333. Mr. *Moffatt.*] Was not there a patent taken out some time since for a process in reference to soap?—Dr. Normandy had a patent.

2334. What was the object of that patent?—The object, I apprehend, was to lower the price.

2335. What ingredient did he propose to introduce under that patent?—I think it was sulphate of soda.

2336. That

2336. That would be an adulteration of soap, would not it?—I should consider it a lowering of the soap.

2337. Viscount *Goderich.*] You are merely speaking to this fact from hearsay I suppose?—I have never seen the patent.

2338. Mr. *Moffatt.*] That would be a fraud upon the public, in the same way, at least, as putting water into gin, would not it?—I do not know whether it would be a fraud upon the public; it would be the same case as that of gin reduced by water.

2339. That patent, I think, was taken out by Dr. Normandy, was not it?—Of my own knowledge I know nothing of the matter; I have never seen the patent; I have heard of the circumstance.

2340. Mr. *Villiers.*] You do not even know what the purpose of the invention was, whether it was to render soap, made of weak materials, hard?—No.

2341. *Chairman.*] Is not a person who takes out a patent for making soap obliged to specify what he puts into the soap?—Yes.

2342. If a person tells the public what an article is made of, it makes a very material difference, does not it?—Yes; in publishing the specification you expose the whole process.

2343. Mr. *Moffatt.*] If that article is sold to the public as Dr. Normandy's patent soap, it would be so; but if it is sold as other soap, is it not to a certain extent a deception upon the public?—If it is sold under the guise of ordinary soap it is.

2344. Viscount *Goderich.*] The whole of your answers in this case are hypothetical?—Quite so.

2345. *Chairman.*] Do the adulterations of tea come under your notice?—They do.

2346. What is the nature of the adulterations generally practised on tea?—In tea as imported, I have found these substances; gum, indigo, a vegetable yellow; I cannot say exactly what it was; Prussian blue, which is rare; carbonate of magnesia, sulphate of lime and silica. In the tea made up in this country I found many substances; redried tea-leaves; other leaves, namely, beech, elm, bastard plane, fancy oak, and willow, made up to represent green tea with gum, Dutch pink, Prussian blue, and indigo, carbonate of magnesia, French chalk, and sulphate of lime. When dried leaves and redried tea have been made up to represent black tea, I have found gum outside the leaf just coated over with rose pink to give it a bloom. Foreign leaves are broken up very small, and sifted through a sieve of a known size; they are then gathered up by means of gum water, and rolled up into pieces, sometimes to represent the caper tea, sometimes to represent coarse gunpowder tea; they are then faced over with colouring matter made of the blue and yellow substances I have named; and they are then bloomed by being put into a bag with a little carbonate of magnesia, French chalk, or sulphate of lime.

2347. Have you ever known arsenite of copper to be contained in tea?—No; I have known carbonate of copper in tea.

2348. Is not that poisonous?—Yes; I have known one instance of it; in that case the Board, on account of the nature of the adulteration, fined the party 10 *l.* for every pound of tea which was found on his premises.

2349. Mr. *Moffatt.*] How much was derived from that penalty?—I think there were 26 or 36 pounds of tea found in his premises, and he was fined 10 *l.* for every pound.

2350. Is the system of fining very generally adopted when you find adulterations practised in tea?—Yes.

2351. Can you state the amount which has been derived from that source in any given year?—A return could be furnished to the Committee if they wish it. I could not give it, because it is not in my department.

2352. Mr. *Kinnaird.*] How does tea manufactured in this country come under your notice?—The manufacture has been discovered either from information, or the vigilance of our own officers; and we have seized the whole of the materials and the apparatus.

2353. Is the manufacture of this adulterated tea a trade of itself?—It was so at one time. I have no reason to believe it exists at the present moment.

2354. What period do you speak of as "one time"?—There were two cargoes of tea wrecked about the year 1840 or 1841; the Treasury granted permission to the underwriters to make the best use they could of this cargo of tea; a party connected

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nected with the tea trade washed this tea, and redried it on a common kiln used for drying malt; this tea found its way into the market at a reduced price; after the cargo was gone, the trade wanted something to lower the price of their tea, and then redried tea-leaves were brought up; it then became a trade for parties to go round to different hotels, and large houses, and buy them up at 2*d.* a pound; the redried leaves, however, were not sufficient to furnish the quantity required, and then resort was had to British plants.

2355. Mr. *Moffatt.*] Do you believe that that manufacture has been entirely suppressed?—I think so.

2356. Mr. *Otway.*] Is it true that a patent was taken out, some years ago, for the manufacture of British tea?—Yes, it is quite true.

2357. Mr. *Moffatt.*] Did you ever see tea produced under that patent?—I do not recollect ever doing so; it was not allowed to be continued; the tea was stopped and destroyed, it was burnt at the Excise Office.

2358. In reference to the tea you have described as adulterated when imported, are you aware what the quantity of that tea is, which is adulterated?—The quantity is small compared with the whole amount brought into the kingdom; this was a quantity of tea grown in the neighbourhood of Canton; it is either black or green, according to the demand; in fact, a large proportion of it was really black leaves, but made up to represent green tea. As far as I recollect, a chest of it was seized by one of our officers; the trader said, "It is as I had it from the Docks." I was ordered to analyse this tea, and I found it very grossly adulterated; I think, to the extent of 49 per cent. The Board directed me to go down to the bonded warehouse where this tea was lying, and I examined a great many chests.

2359. Mr. *Kinnaird.*] Do you believe it to have been adulterated in this country, or abroad?—It was a foreign adulteration.

2360. Mr. *Moffatt.*] You say the tea was adulterated to the extent of 49 per cent.; with what ingredient was it so adulterated?—Gum was the chief portion of the adulteration; they were small fragments glued together by means of gum, and then coloured over.

2361. Under what designation was the tea imported?—I think they merely called it tea; it went under the name of common gunpowder.

2362. Do you know what was the extent of that cargo?—I do not know; I went to a great number of those packages, and sampled them, and found they agreed with the quantity seized from the trader, and we were obliged to give it up.

2363. Do you know what proportion the gunpowder tea, so composed, bears to the whole quantity imported?—I do not

2364. Mr. *Kinnaird.*] You have stated that you do not think that that process of adulteration goes on now; what is your reason for thinking that?—I believe we should very soon detect it; we had no difficulty in crushing this trade, when we knew of its existence.

2365. What measures did you use?—We were vigilant in making our officers look out among the retailers, and when we had a suspicion, we had samples taken and sent up.

2366. Mr. *Moffatt.*] Did you ever hear of any other cargo of tea imported which was adulterated to the extent of 49 per cent.?—No. I am not quite certain that I am right in that amount.

2367. Did you ever hear of any other cargo of tea which was very largely adulterated when imported?—No; there was some tea, as it was called, introduced into this country from Singapore, but there was not a particle of tea in it: I took samples to Dr. Lindley myself, and though he could not state what leaf it was, it was not a British leaf nor a tea leaf. A large quantity of this article came in, but it could not be sold, and I believe it was shipped to Holland, and sold in Holland.

2368. That tea paid a duty of 2*s.* 2½*d.* a pound, did not it?—Yes.

2369. Have you recently heard of any gross adulterations of tea as imported?—No; the adulteration which exists is the facing of the tea.

2370. What proportion of adulteration is there as regards weight compared with the whole importation of tea?—It is very small.

2371. Is it anything like a quarter of a pound in 100 pounds?—It would be difficult to say the exact amount.

2372. Is the matter which is used in the facing deleterious to the health of the consumers

consumers of tea?—Not if indigo be the blue used, I do not think any injury would accrue; but I think it is a very foolish practice to encourage.

2373. *Chairman.*] Are there any injurious facings used?—Yes; Prussian blue I have found in the tea as imported from China.

2374. Mr. *Moffatt.*] Is that one of the adulterations practised in this country?—Yes.

2375. Is it within your experience that no poisonous substance is used in the facing of tea at the present time?—It is possible there might be some samples found now coloured with Prussian blue; but I have not seen any myself.

2376. Is it within your experience that there is any other kind of adulteration of tea except the facings of the green teas?—I am not aware of any other.

2377. And no other has been brought to your notice by your officers?—No; some of the common caper tea from China is very grossly adulterated; in fact, they are made up in small nodules and disguised in the manipulation; I do not think, however, much of that tea is introduced.

2378. You have found nothing in that spurious caper which is injurious to the public health?—Nothing but Prussian blue.

2379. Mr. *Otway.*] Does not the glazing matter contain injurious substances?—The only injurious substances I have found were carbonate of copper and Prussian blue.

2380. The glazing matter adds to the weight, does not it?—Not to any appreciable amount; it is merely a superficial coating, so thin that you could not define the thickness of it; the weight, I apprehend, is very small.

2381. Have you had much experience of the Assam teas?—I do not know that I have ever seen a specimen.

2382. *Chairman.*] You gave evidence before the Committee which sat on the Tobacco inquiry some years ago, did you not?—I did.

2383. Samples were prepared at that time for the Excise, adulterated in particular ways, and afterwards submitted to yourself and professor Graham?—Yes; and the late Professor Phillips.

2384. Were you able to detect all the adulterations in those specimens?—Not all.

2385. I suppose at the present moment those adulterations could have been detected?—We could have detected them then, but we were placed in very difficult circumstances. Mr. Hume was the Chairman of that Committee. We protested against the mode in which we were to undertake the examination; we said it was an unfair test of chemistry to send us samples of tobacco without our having any standard to fall back on, and then to lay our short-comings upon the science of chemistry; the tobacco might have been adulterated with the constituents of the tobacco plant itself. Mr. Hume said he could see no use in our having standards, and we were refused them, therefore we undertook the examination under those circumstances, and did the best we could.

2386. From the progress of science, have not you many more means at your disposal for detecting adulterations now, than you had some years ago?—We are more expert.

2387. Do not you use the microscope more than you did?—Very largely.

2388. You would not suppose that the Chancellor of the Exchequer of the present day would be able to say that a chemist could not detect the existence of chicory in coffee?—We have no difficulty in detecting chicory in coffee.

2389. Such a report, you are aware, was once quoted by the Chancellor of the Exchequer?—Yes; that is as far back as 1849. The fact is, the subject had not then been studied as regards the adulteration of coffee and chicory.

2390. You feel, no doubt, that you do now possess, from great experience, and from the use of improved instruments, a much better means of detecting adulterations than you did at that time?—I do not think we have the slightest difficulty in detecting chicory; and we have great facility in detecting adulterations generally.

2391. Mr. *Kinnaird.*] Within the last few years, have you exercised much more vigilance in reference to these matters than formerly?—Only as regards coffee, I think. With respect to beer, we had at one time to take the declaration of the brewer; we had no means of ascertaining the gravity at which the beer was brewed. Having now arrived at a standard, we are perhaps more active as regards beer.

2392. Mr. *Gregson.*] You say that in the last 12 years you have been called upon to examine 142 samples of tea; that is, about 12 in each year; are you

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aware that about 900,000 packages are imported in a year?—The kind of examination we have of tea is this: an officer, who is supposed to be qualified to make this examination, goes into the trader's premises, if he suspects anything wrong, and examines the tea; if after he has made the examination he is satisfied that nothing is wrong, he does not even take a sample; if he has a suspicion that something is wrong, which he cannot make out, he takes a sample, and it is forwarded to the Board for examination. There might have been some thousands of samples of tea examined, but only 142 have been sent up in 11¾ years.

2393. Mr. *Otway.*] The officer having been satisfied?—Yes.

2394. Mr. *Moffatt.*] The result of your inspection of tea has been, that, assuming there are 900,000 packages imported annually, there were only sent up to you 12 samples as being suspected by your officers, and out of those 12, you found about six were adulterated?—The total for the 11 years was 142 sent up; 65 were found genuine, and 67 adulterated.

2395. Mr. *Otway.*] What are the qualifications of the officers who, you say, can at once determine the point?—We have about 70 men, who have been chemically educated; and they are also specially educated at our own laboratory before they go out in the subjects they will have to deal with.

2396. Are they furnished with all the requisite apparatus and means of testing and analysing the substances they may meet with?—They have not a full laboratory, but they have a certain amount of means.

2397. What are the salaries of those officers, generally speaking?—They range from 100 *l.* up to five or six hundred.

2398. *Chairman.*] Have you found many adulterations in snuff?—Yes.

2399. What are the substances generally used to adulterate snuff?—We recognise certain adulteration in snuff, that is, in Scotch and Rappee snuff; the law permits the use of common salt, and what are termed alkaline salts. That is allowed in Scotch and Rappee snuff. In Irish and Welsh snuff we allow the use of lime water only. Beyond those substances, we have found in different samples the following: common peat, such as you would get from the bogs of Ireland, starch, ground wood of various kinds, fustic being most predominant, extract of logwood, chromate of lead, bichromate of potash, and various ochreous earths.

2400. Would any of those mixtures be injurious?—The extent of the chromate of lead would not be great, it might be injurious, but I am not aware that it is. We have also had samples of spurious snuff made up, and variously scented, to represent Scotch and Welsh and Irish snuff, which has been composed of the following substances; sumach, umber, which is a dark earth, Spanish brown, and common salt. In another case we found peat, umber, and common salt. In another case peat, fustic, and common salt. In another ground coal, peat, and extract of logwood. In another ground peat, yellow ochre, lime and sand; the whole of them being more or less scented. I have no doubt they were made for the purpose of being mixed with other snuffs.

2401. Have you conducted any prosecutions for adulteration in snuff?—Yes, I have attended to give evidence on them. We have had in the whole 11¾ years, 1,036 cases of adulteration. It may be saying too much, to suggest that they represent the number of prosecutions, because there might be two or more samples in a case.

2402. Viscount *Goderich.*] Did you prosecute in every case?—In every case.

2403. Mr. *Moffatt.*] Have you ever found any of those ingredients which you have described mixed with snuff?—Yes; peat was a very common adulteration at one time.

2404. Is it injurious to the body when taken through the nostrils?—It is not injurious.

2405. Not more injurious than tobacco probably?—I should think less so; fustic we have found to be a common adulteration in Irish snuffs.

2406. What are the properties of fustic?—It is a dye wood; the object of using it is to impart colour.

2407. To give a yellow colour to the snuff?—Yes.

2408. Have you found fustic in large quantities in snuff?—Not large; probably 10 per cent.

2409. Mr. *Kinnaird.*] Has it any deleterious effect?—No; it is simply taking wood, instead of tobacco.

2410. *Chairman.*] Is there any other subject which you wish to refer to?—With respect to pepper, the number of samples was 1,116; 540 were found to be genuine,

genuine, and 576 adulterated; all being sent up under suspicion. We have found rice, sago, potato starch, linseed meal, chillies, husks of red and white mustard seed, wood, wheat bran and flour, oat flour, and ground gypsum or crystallised sulphate of lime. The stock material for adulterating pepper is the husks of red and white mustard seeds, and linseed meal warmed up with chillies.

2411. Mr. *Moffatt.*] Are these things more prejudicial than pure pepper?—I should not like to swallow much gypsum. There is nothing very hurtful in the other substances.

2412. *Chairman.*] They are decidedly not pepper?—No. The question with us is a question of duty; we are not a Board of Health, but a Board of Revenue.

2413. Mr. *Gregson.*] Chillies are not injurious, are they?—Certainly not.

2414. *Chairman.*] The persons who sell that material for pepper are committing a fraud upon the public?—No doubt of it. The pepper adulteration is of a kind that we have full power to put down, because it is an adulteration which an ordinary officer can readily discover. We have a vast number of officers who are competent to say whether a sample of pepper is adulterated or not.

2415. Mr. *Gregson.*] Have you had many prosecutions for adulterating pepper?—Yes; the cases I gave you were 576; but they would not represent the number of prosecutions; they would be rather above the number. There was a substance at one time introduced called African pepper. We have found the same substances in that—rice, sago, chillies, linseed meal, husks of red and white mustard seed, common salt, rape seed, the bark of pepper, and sometimes inferior pepper itself. With regard to tobacco, we have found in cut tobacco, sugar, liquorice, gum, catechu, common salt, saltpetre, and various nitrates; yellow ochre, Epsom salts, Glauber salts, green copperas, red sandstone, wheat, oatmeal, malt commings, chicory, and the following leaves: coltsfoot, rhubarb, chicory endive, oak, elm; and in fancy tobacco I once found lavender, and a wort called mugwort. It is a fragrant herb, suggestive rather of the nutmeg. In roll tobacco we have found rhubarb leaves, endive, and dock leaves, sugar, liquorice, and a dye made of logwood and sulphate of iron. The adulteration of tobacco at one time was large. The law allowed the adulteration of tobacco for a short period, but the experiment was not very successful as regards the revenue, and it was found necessary to put a stop to it.

2416. Mr. *Moffatt.*] Upon what principle did you allow the adulteration of tobacco?—I do not know; it was under an Act called Baring's Act; anything was allowed except the leaves of trees, herbs, and plants. But it was never contemplated when the permission was granted that the trade would exercise the amount of ingenuity they did. The law thought it was impossible to get the foreign substances in to the extent they did; they got them in to the extent of 70 per cent. At present, water only is allowed for mixing with tobacco.

2417. How much water is allowed?—Any quantity you can get in. At the present moment I believe the tobacco trade to be perfectly free from adulteration. We are not losing one-eighth per cent.

2418. Viscount *Goderich.*] Meaning that the presence of a large quantity of water is not an adulteration?—We allow that.

2419. Mr. *Moffatt.*] Is there any other article within your knowledge which is largely adulterated, which the public of this country either eat, drink, or smoke?—I have had a few other things under my notice. Two or three things have been brought out to mix with coffee. There was a substance a few years ago called Turkish Aroma. It was sold as being a great improvement to coffee, when mixed with it. I am not aware that it is in existence now. One sample was found to be roasted peas, chicory, and caramel; another sample consisted of a roasted root, which I believe was a dandelion root, and caramel and sugar; a third contained the true chicory, the roasted endive root.

2420. It is within your knowledge that these articles are now used?—I believe they were used only to a small extent, and I do not think they are now in existence. There was another substance called cafeine, which was a mixture of roasted grain and ordinary chicory. That was sold as an improvement to coffee. Another substance of the kind, called bouka, was beetroot roasted.

2421. Do you believe these substances to be in use now?—No, I am not aware that they are now in existence. Beetroot is largely cultivated for chicory, and yields the best chicory.

2422. Mr. *Otway.*] Do you know anything of the substances called essence of

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coffee and essence of tea?—No, they do not come before me. There was one substance imported in the year 1849, called "La Veno Beno." I examined that, and the following was the analysis: 24 per cent. of sumach leaves, and 76 per cent. of catechu; it was a strong astringent. The first case we had of the use of that in this country was in Glasgow. The Board immediately took measures to put a stop to it, and I believe it had a very short existence.

2423. Mr. *Moffatt.*] The use of that you very easily suppressed?—I have heard nothing of it for years.

2424. Mr. *Kinnaird.*] Have you examined any cocoa?—Though that is under us, we have not much to do with it. In the year 1846 there were some complaints to the Board about the adulteration of cocoa, and I was directed to go about and examine the various manufactories in London. I did so, and took samples. It was stated to me that there was a large introduction of earthy matter, but the analyses we made of those samples did not justify that opinion. Our object was merely to get the amount of earthy matter, irrespective of what it might be. The first sample of the nuts when burnt gave 4·1 of ash and 1·4 salts, earth 2·5 and 2–10ths of sand. The second sample gave 4·9 of ash, 1·3 salts, 2·7 of earths, and 9–10ths of sand. The third gave 3·1 of ash, 1·1 of salts, 1·9 of earths, and 1–10th of sand. The samples of cocoa yielded as follows:—No. 1, 4·0 of ash, 1·2 of salts, 2·5 of earths, and 3–10ths of sand. No. 2 gave only 7–10ths of ash, 4–10ths of salts, 2–10ths of earth, and 1–10th of sand. The third sample gave 4·1 of ash, 1·4 of salts, 2·4 of earths, and 3–10ths of sand. The fifth sample gave 4·0 of ash, 1·4 of salts, 2·2 of earths, and 4–10ths of sand. The sixth gave 4·7 of ash, 1·0 of salts, 3·2 of earths, and 5–10ths of sand. The seventh gave 5·0 of ash, 1·0 of salts, 3·6 of earths, and 4–10ths of sand. The eighth gave 5·1 of ash, 9–10ths of salt, 3·5 of earths, and 5–10ths of sand. The ninth gave 5·1 of ash, 1·0 of salts, 3·4 of earths, and 4–10ths of sand. The Committee will perceive that if the manufactured article had been really all cocoa there is not much to complain of as regards earthy matter, but that is not so, because there was a large per-centage of farina or starch present, and a large per-centage of sugar. In one case, in fact, where I succeeded in getting proportions from a manufacturer of what he called his best soluble cocoa, there were, in his own language, cocoa 42 lump, 42 white, and red 56. The cocoa represents the nut, the lump the sugar, and the white is starch, and the red oxide of iron to colour it. The per-centage of cocoa in that sample would be 30 per cent, and that was stated by the manufacturer to be his best soluble cocoa.

2425. The manufacturer knew the secret of it?—I believe, if we trace back the consumption of cocoa in this country, we shall find, that before it was rendered soluble by admixture with sugar and starch the consumption was very small; that was the reason the manufacturers adopted the mixture of starch and sugar.

2426. Mr. *Gregson.*] Starch and sugar are not injurious?—No.

2427. Is there any ingredient in that analysis which is injurious?—No; oxide of iron, in the small quantity taken there, I should not think was injurious.

2428. Mr. *Moffatt.*] It is your belief, that if cocoa were sold pure, and were not mixed with saccharine and with starch, the public would not use it?—I believe it would drive cocoa out of consumption.

2429. The public would be deprived of the use of cocoa unless it were so adulterated?—No; the public can get the nibs now, which are pure cocoa, but they will not buy them.

2430. Mr. *Gregson.*] There is not much cocoa sold to the public for consumption in the shape of nibs, you think?—I believe not; I believe the consumption is very small.

2431. Mr. *Moffatt.*] 12,483 samples of coffee you have analysed in the course of the 12 years, and you found 12·9 per cent. of adulteration; were they all samples which had been suspected, and were consequently submitted to you for analysis?—The chief part of them, I believe, were so; since we have been more actively engaged in the examination of coffee the local officers have been instructed to visit traders in their neighbourhood, and the selection is left to them.

2432. Have you contributed to the investigations of what is called the Analytical and Sanitary Commission, which was formed some years ago, whose proceedings were published in the "Lancet"?—In 1851 Dr. Hassall applied to our Board, and asked to be furnished with some analyses of tea and other substances, which we gave him; I believe 11 samples were furnished to him.

With

With regard to pepper the Committee will see that we were very active in the year 1842; an examination of pepper is purely a microscopial examination.

2433. *Chairman.*] Your opinion is that the Excise has at the present moment facilities for detecting adulteration in certain articles of a very considerable kind?—I conceive we have full power to protect the revenue.

2434. Do you see any reason, supposing the revenue not to be concerned in the matter, why the same means should not be used for the detection of adulteration and the protection of the public generally?—No doubt similar means can be applied to protect the public from adulterations; it would, however, require great practice; a mere knowledge of chemistry alone is not sufficient; the great difficulty is to train practical men, who can go into a place and say, this is wrong, and this is right. Pure chemistry would have been quite incompetent to have protected the tobacco duty against loss from adulteration. A man to do that must not only have chemical knowledge, but a practical knowledge of the manufacture and the nature of tobacco; and he must know the various processes, so that when he is in the manufactory he can distinguish one from the other. A practical man can determine in a moment whether a sample is genuine or not from his great experience; and I apprehend, in order to carry out anything like that which we are doing you must have men who have practical experience, who can go in and form a tolerably accurate opinion of what they are seeking after upon the spot.

2435. Mr. *Gregson.*] The number of cases seems to vary very much in different years; have you always the same number of officers equally upon the alert?—Always the same.

2436. *Chairman.*] You are educating a special class of persons at the present moment for the purpose of detecting adulterations in articles which come under the Excise Laws?—We are.

2437. Such a class could not be considered altogether to possess the practical information you speak of in reference to the detection of other adulterations?—We have endeavoured to give it to them.

2438. Mr. *Kinnaird.*] Have you any difficulty in finding men to carry out the present improved methods of investigation in your department?—No, we have no difficulty. They are first sent to the University, and they have either two or three years' education at the University, and they then come to me. I give them all the knowledge I can within a limited period. They are then placed under the guidance of some older and more experienced hands, and they go round and visit different traders, and see the appearance and the characteristics of adulterated articles and genuine articles, and so we endeavour to give them a practical knowledge of that which they have to attend to.

2439. Mr. *Villiers.*] The course you have been describing is that which a man must go through to be perfectly qualified?—Yes.

2440. But for the detection of ordinary adulterations in the necessaries of life, I suppose a man less qualified than that would be sufficient?—I am not sure that there would not be more difficulty in some cases of that kind.

2441. With respect to bread and coffee and milk, the adulterations could be easily ascertained by a public officer, could not they?—There would be no difficulty in ascertaining a single case; but when you look at the extent of the consumption of those articles, a difficulty arises how you are to analyse every sample which must be taken.

2442. Would not the existence of such an officer deter people from committing such practices?—Yes, no doubt. I have had the remark made to me by a tobacco manufacturer, What use is it sending such a man as that here? He did not know what he was about; he was a man who had a chemical knowledge, but he had no practical experience; he might have been enabled from his chemical knowledge to have made a satisfactory examination of one sample of tobacco, but the difficulty was, that upon going into the factory he did not know what to do when he was there.

2443. Mr. *Gregson.*] You mean to say, that a class of young men must be educated separately for each different trade?—They must have a knowledge of the various trades.

2444. For discovering adulterations in things which the poor consume, such as bread and coffee and milk, do not you think it would be very easy to train a man who should be the inspecting officer of a district for those purposes?—Any individual may acquire the knowledge in time.

 2445. I suppose

2445. I suppose for tobacco you require a highly qualified man?—It is a very difficult thing to examine.

2446. Mr. *Moffatt.*] Is not it as difficult to detect the adulteration of beer with water as it is to detect foreign substances in tobacco?—We cannot tell unless we have the gravity of the beer; give us the original gravity of the beer that it was bought at, and then we can tell what had been done with it afterwards.

2447. It would require that there should be laws which made it illegal to sell beer under a certain gravity, or it would be impossible to detect adulteration with water?—Yes; it is very true, no doubt, that adulteration is practised in beer, but not to the extent which has been generally stated. You would not call it an adulteration if I, as a beer retailer, buying Barclay and Perkins' porter, put into it a weak, low ale, which I buy at half the price; that is well known to be a common practice in the trade. There are a certain class of small brewers who brew light, cheap ales, to be mixed with the porter and stout of the brewers. We must not, therefore, because the publican is buying a beer at 35 *s.* or 36 *s.* per barrel, say that that man is adulterating; he is mixing, but he is mixing what the law permits.

2448. Mr. *Villiers.*] Have adulterations diminished, in your opinion, since these chemical inspectors have been appointed by the Excise?—I believe they are totally suppressed in the article of tobacco, with which the system commenced.

2449. Do you extend that opinion to the other things they are bound to report on?—Adulteration no doubt exists, but it does not exist, in my opinion, to an alarming extent. I have no doubt the existence of those men, if they performed their duty, must have a good effect.

2450. The apprehension of an examination of those articles has, in your opinion, had the effect of diminishing adulteration?—Yes, and I apprehend the very fact of their existence being known must exercise some effect.

2451. Therefore if the system were carried out still further, you would expect that adulteration would be diminished in other things?—I do not think there is any difficulty in putting down any adulteration.

2452. The existence of those officers having already diminished adulteration, if the system were extended still further, so that they should examine things which did not pay duty, but which were adulterated, you would expect that adulterations in those articles would be diminished?—I see no reason why they should not.

2453. Mr. *Gregson.*] You say that the system does not seem to have diminished the adulterations in pepper and coffee?—I will give the Committee a return of the number of traders whom we have to overlook. Of brewers we have 41,446 in the United Kingdom; of beer retailers we have 131,468; of tea, coffee, and pepper dealers we have 142,747; of tobacco dealers we have 236,647; and manufacturers, 571, making a total of dealers and manufacturers of 237,218.

2454. Mr. *Villiers.*] What is your inference from that statement?—My inference is that the cases of adulteration are very few in proportion to the number of traders. I take credit to ourselves that we detect all the adulteration that happens.

2455. *Chairman.*] If such vigilance is so successful in regard to tobacco and such things, a similar vigilance exercised in reference to other articles might be equally successful?—I should expect so.

2456. Mr. *Gregson.*] Have you a sufficient staff of officers to overlook all that number of licensed traders?—Yes, I think we have; they would not be competent to make an analysis, but they can tell the quality of the article pretty well.

2457. Mr. *Moffatt.*] Are the inspectors who visit the shops of those 552,000 traders persons who are competent to detect the adulterations you refer to?—They are not competent to make an analysis.

2458. Are they competent to decide where there is a suspicion, and to forward samples to you?—Yes, I think so. There are many things which will enable a clever officer to tell; he is in the locality; he knows the trader, or should know all about him, and he can form a pretty correct estimate of his dealings, and by those things he is guided.

2459. Mr. *Gregson.*] What is the total number of inspecting officers?—I think it is about 4,000.

2460. Mr. *Moffatt.*] The Committee are to understand that the whole of the samples concerning which you have been giving evidence have been sent to you under circumstances of suspicion?—Yes.

2461. And you have found a per-centage varying from 12 per cent. to 87 per cent. in those suspected samples?—Yes.

2462. Mr. *Villiers.*] Do you speak of the United Kingdom?—Yes.

2463. Mr. *Moffatt.*] Did you find any injurious article of adulteration in the cocoas you analysed?—No, nothing injurious.

2464. Have you found any injurious ingredient mixed with chicory, so far as it has come under your notice?—No.

2465. Have you ever found any oak bark, or tan, or calcined liver, in coffee?—No; the only other substance I have found, except chicory, was caramel.

2466. What, in your opinion, would be the effect of extending this species of supervision to all articles which are sold by the various trades of the United Kingdom?—I can hardly tell.

2467. I mean an inspection applying to drapers and silk mercers, and so on?—I think that would be unbearable.

2468. If calico is sold to the public, in which there is starch, it looks a better article, and the public buys and prefers it to cotton without starch; would you recommend the introduction of a system of inspection to detect and prevent that?—No; I would recommend the public to look after themselves.

2469. Is not it your opinion that the public can generally best protect themselves?—I think so.

2470. Mr. *Villiers.*] You would distinguish calicoes from the necessaries of life, which if adulterated deleteriously, must injure the public health very much, would not you?—Certainly.

2471. Mr. *Moffatt.*] Would you term gin a necessary of life?—It is so to some, I am afraid.

2472. *Chairman.*] You talk of leaving the public to take care of themselves in these matters; do you think the public are able to distinguish between two things which are called opium, having precisely the same external appearance, one being opium, and the other containing not a particle of morphia in it?—No, I do not think they could. I think drugs are an exception.

2473. Do you think the public can detect the quantity of alum which is to be found in bread?—I am not sure that the public could protect themselves against alum. I do not think the amount ordinarily used is injurious to health.

2474. What do you say to plaster of Paris?—If that has been found in bread, I think it has been in very exceptional cases.

2475. Mr. *Moffatt.*] Did you ever hear of its occurring in bread?—No.

2476. Is not it the property of alum, that when exposed to a sufficient heat to bake a loaf, it discharges the water which is a component part of the alum?—I am not sure that it would do so under such a heat; I have never tried it.

2477. What does the ordinary heat of baking go up to?—I cannot say; it is not high enough to drive all the water off from alum.

2478. When the water is entirely driven off from alum, what is the appearance of it?—It will fall into a dry powder.

2479. Have you read Doctor Hassall's book?—No; I have not read the book; I have read some of his reports.

2480. Do you generally agree in his conclusions with regard to the extensive adulteration of the necessaries of life?—No; I think it is a great exaggeration; I do not think myself that it is true.

2481. Mr. *Villiers.*] You would not say that your experience was equal to his in the examination of those things, would you?—I have had a large experience in several of the necessaries of life, which I have stated, and on that experience I found my opinion. I compare those articles with other articles, and it is only a fair inference to suppose that other articles are pretty much the same as those which have been examined. One result of the very extended examination I have spoken to is, that I do not think there is any reason to believe that adulteration does exist to the extent which has been stated.

2482. It is your duty, when these things are referred to you, to pronounce upon them; but you have not made it your business for three or four years together to inquire into the extent of the adulteration of articles of general use and consumption, as Doctor Hassall has?—No; I have not troubled myself with anything except matters which come within my own province.

2483. What ground have you then for saying that Doctor Hassall has grossly exaggerated?—I found my opinion upon my own experiments. If I understand his statement aright, he examined beer by means of acetate of lead. I think it

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was so stated in the "Times;" but I refer to it under a doubt. If Doctor Hassall examined samples of beer with acetate of lead, and judged of them from that, it was a most fallacious conclusion to arrive at, to suppose that the beer was adulterated because a precipitate was caused by adding acetate of lead to the beer. If you add acetate of lead to any beer which was ever brewed, or will be brewed, you will have a precipitate. My own experience as to beer I think has been greater than Doctor Hassall's.

2484. You do not know what his experience has been?—I only judge by the number of the experiments he has stated.

2485. You have not read his book?—No; I have read his reports. Out of that large number of samples of beer I have mentioned, there was no reason to believe that more than 12 were adulterated.

2486. *Chairman.*] How many prosecutions have there been for the adulteration of beer?—Probably not above four.

2487. Mr. *Gregson.*] Were they all in London?—No.

2488. Mr. *Moffatt.*] I think your evidence has gone through some of the principal articles of consumption, with the exception of drugs, in this country?—I believe it has.

2489. Consequently it is fair to presume, having had samples sent up to you by the vigilance of 4,000 officers, for inspection, that your experience is at least equal to that of Dr. Hassall?—I do not wish to compare myself with Dr. Hassall; but I have had a very large experience.

2490. How many years have you been analytical chemist to the Board of Inland Revenue?—Thirteen years.

2491. Mr. *Villiers.*] Are you aware that Dr. Hassall purchased samples of the goods which he analysed as a common buyer?—Yes.

2492. You had your samples sent up by your own officers?—Yes.

2493. Mr. *Moffatt.*] As suspected samples?—Yes; many that I have given you here were samples seized by people who were perfectly competent to determine on the spot what they were about.

2494. Have you ever read the evidence which was given before the Committee of this House on the subject of tobacco, a few years ago?—Yes, I gave evidence before that Committee.

2495. Surely there was strong evidence of adulteration there?—There was some very strange evidence given there.

2496. There were the names of manufacturers whose names were not published, because they disclosed the practices of the trade?—That was not as regards adulteration, that was as regards smuggling.

2497. Are you aware that one manufacturer gave a list of 23 articles with which tobacco was mixed or adulterated, some to give it flavour, and some to give it weight?—I am not aware of the list, but I am tolerably conversant with the evidence which was given on that occasion.

2498. Are you aware that a manufacturer, or a person connected with the trade, did give in a list of the different articles used in adulteration?—I do not recollect to have seen the list. The question before that Committee was the question of the duty. It was endeavoured to show that we were incompetent to protect the revenue; we maintained that we were, and were very severely tested.

2499. Mr. *Moffatt.*] The result of your opinion is, that the revenue is now entirely protected in reference to the article of tobacco?—Yes.

2500. *Chairman.*] Will you say where those different samples of beer were taken from, which were taken by you?—The chief of them came from the brewery.

2501. Your examination applies to the quality of the beer as sold by the brewer, but not to the quality of the beer as sold by the publican?—It chiefly relates to the brewer.

Alphonse Normandy, M.D., called in; and further Examined.

A. Normandy, M.D.

2502. *Chairman.*] A QUESTION was put just now to the last witness with regard to a patent of yours for the manufacture of soap. You are under the impression that the inquiry may tend in some degree to injure you as the patentee?—I am anxious to give some information which the Honourable Member was evidently anxious to obtain. It is this; I have taken out a patent for the introduction of a certain quantity of sulphate of soda into soap for the following purpose. Soap is made of materials which are known in the trade as "goods," and

as

as "weak goods." The materials which are known as weak goods are kitchen stuff, bone fat, and resin; resin being the weakest of all weak goods. These substances are called weak goods, because when made into soap, the soap produced with them is exceedingly soft or tender; it will scarcely support its own weight, if the material used is very weak indeed. If, for example, resin be made into soap, instead of obtaining a hard soap you obtain a soap which is as soft as treacle. This is owing to the soap being a deliquescent salt, which has the property of absorbing moisture from the air, and it becomes in fact dissolved into that water. If such soap be put into an oven, and the water be expelled by the heat of that oven, the soap withdrawn from the oven will be quite hard, but if left exposed to the air for a couple of hours or more, according to the weakness of the goods employed, it would become as soft as treacle again. Knowing that the weakness or tenderness of soap was due to its property of absorbing water, I thought that if I introduced into soap made of such weak materials a salt, which, like sulphate of soda, has the property of absorbing water, to become solid, that is to say, to crystallise, I should introduce into such soap an antagonistic element, which would attract to itself, to become solid, the water which the soap would absorb to become liquid, and I found that the introduction of a certain quantity, 5 per cent., for instance, of sulphate of soda, was quite sufficient for the purpose. I have on the subject the highly favourable reports of Professor Miller, of King's College, Dr. Hoffmann, Professor of Chemistry at the Museum of Practical Geology, Professor Redwood, who has given evidence before the Committee, and Dr. Stenhouse, Professor of Chemistry at Bartholomew's Hospital, and it has been satisfactorily established before the Privy Council the other day, when I applied for an extension of my patent, that the process was a valuable one, and that it had merit in it, and they granted me an extension.

2503. Mr. *Moffatt.*] So that the mixture of sulphate of soda with soap has proved of great advantage in the manufacture of soap?—Of weak soap.

2504. Do you call that an adulteration?—No.

2505. The general tone of the evidence you gave was, that to mix with an article other substances foreign to the article under the name of which it was sold, was an adulteration?—I was very pointed in the explanation which I gave as to adulteration; I call adulteration the introduction into an article of a substance which confers upon that article no quality whatever, and I went on to explain that the mixture of cotton with wool was not in my opinion an adulteration, provided that fabric was not sold as wool. Now soap which is mixed with sulphate of soda, is known in the trade and sold under the name of sulphated soap; therefore, that is no adulteration as I conceive. It is well, also, that I should say that it is a practice with the Privy Council I believe never to grant an extension for a Patent unless it is proved to their satisfaction that there is considerable merit in the invention; in fact, that is the language of the Act; it must be of great public utility, and possessing considerable merit.

2506. It is quite apparent from the evidence we have heard, that, in fact, many of these mixtures do greatly improve the articles with which they are mixed?—I do not myself admit that.

2507. It is evident that some articles would not be used at all, except for the mixtures which, according to the theory you lay down, would be called adulterations?—I consider, with great submission, that the theory I lay down has nothing to do with the evidence which has been brought before the Committee. I think that tends to prove that in not a single instance does the adulteration which has been practised, as I have explained the meaning of the word, make any improvement in the article sold.

2508. Do you think that selling soap, which has in it 15 or 20 per cent. of sulphate of soda, as pure soap, would be a fraud?—I call that a fraud.

2509. Unless your soap is sold as sulphated soap, it would be a fraud?—Decidedly.

2510. Do you think that selling a fabric of cotton and wool mixed, as wool, would be a fraud upon the public?—Decidedly.

2511. So that the soap for which you have a patent, is invariably sold as sulphated soap?—Yes; and it is impossible to sell it otherwise, for its appearance is quite distinct from that of other soap.

Mercurii, 8° die Augusti, 1855.

MEMBERS PRESENT.

Mr. Scholefield.	Mr. Gregson.
Mr. Kinnaird.	Viscount Goderich.
Mr. Alderman Cubitt.	Mr. Otway.
Viscount Ebrington.	Mr. Villiers.

WILLIAM SCHOLEFIELD, Esq., IN THE CHAIR.

Richard Archer Wallington, Esq., called in; and Examined.

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2512. *Chairman.*] I BELIEVE you are a Solicitor, resident at Leamington?—I am.

2513. And Chairman of the Local Board of Health there?—Yes.

2514. Have you taken a great deal of interest in sanitary matters, and questions affecting the health of the people?—I have done so, and that, I presume, led me to the office which I have been appointed to.

2515. Have you had under your consideration the present position of the law with respect to the subject now under the consideration of the Committee, and the remedies which in your opinion would be best adapted to meet the existing difficulties?—I have.

2516. Will you be good enough to give us the results of your experience and judgment in the matter?—In the first place, I must put myself in a proper position in giving my evidence. I agree with the statements of Mr. Redwood and Mr. Phillips, that the amount of adulteration existing has been very much exaggerated; I entirely concur in that, and I think it is only due to traders to say, that I think they have not always been dealt fairly with, so far as the tests upon which some of the evidence has proceeded are concerned.

2517. Are you referring to any specific trade, or do you mean to apply that to bakers and confectioners and drug-grinders, and every other trade?—At the conclusion of my evidence I can give you the data upon which I form my opinions; I form them from facts which have been published, and also from the evidence which has been given before the Committee; I have distinct facts on which I frame my opinion, in confirmation of the views of Mr. Redwood and Mr. Phillips. Although it is not necessary for the remedies I propose to make any distintcion between adulterations which are innocuous and adulterations which are what I should term beneficial; still, taking a general view of the question, I should wish to draw a distinction of that kind. I wish it to be understood that my plan would work just in the same manner whether there were no adulterations, or whether they were of tenfold the extent which they are now represented to be. I should explain that distinction; I mean that certain restrictions would be very beneficial to the trader, and also to the consumer, irrespective of any assumed adulterations; that is to say, supposing, on the one hand, adulteration had never taken place, or supposing, on the other hand, that the adulterations had been tenfold, the same remedy would apply. I therefore distinguish between what I should term innocuous admixtures and injurious adulterations. I wish to show particularly that, in my opinion, the former may be beneficial, and ought to be encouraged, particularly as they tend to reduce the price of the article. In illustration of that view I will draw the attention of the Committee to the substitution of articles; that is, as it appears to me, the very incentive to competition.

2518. What do you mean by the substitution of articles?—The substitution of one thing for another; that is to say, you may have a foreign product which has been sold immemorially under any specified name; and you may have another article of home manufacture or of home production which, although not identically the same thing, may be beneficially substituted for the article which may have before been sold under the name known in the trade.

2519. Do you mean that the substituted article is to be sold under the name of

of the original article?—Yes, decidedly, unless you would destroy the main ground of public competition.

2520. Does your opinion go to this extent; that supposing a man having purchased a pound of coffee, goes into another shop, asking for the same article, and gets 75 per cent. of chicory, that is one of the innocent adulterations of which you speak as being the result of competition?—Certainly; and for this reason, there is no standard of the value of any article; there is nothing to represent the fact that any article shall be sold for a certain price.

2521. Is there not an understanding between the public and the seller that the seller shall give to you what you ask for?—I think not; neither do I think it beneficial that it should be so. The same machinery which fixes the price of the one article fixes the price of the other; and you cannot draw a distinction, nor show any reason why competition should not regulate the price of a mixture of coffee and chicory, just as it does the price of coffee alone or any other article.

2522. A man purchases a pound of coffee for 1 *s.*; he goes to the next shop and purchases a pound of what purports to be coffee, but which is adulterated with 75 per cent. of chicory, and he pays 1 *s.* for it; do you think there is any injustice in that?—I believe it should be left to regulate itself; if A adulterates with 75 per cent. of chicory, there is no reason why B. should not adulterate with the same extent of chicory, and, therefore, they would be perfectly in competition with each other. If the article were sold at an improper price, it would regulate itself, and that is the only means by which it can do so; otherwise you would take from coffee every substance which has operated to bring down its price; you would leave the article of coffee almost a monopoly, and it might have the effect of taking chicory, which is certainly admitted to be liked by many people, out of the market altogether; for I suppose chicory could not be sold alone.

2523. I need not ask you if you are opposed to the Treasury Minute with respect to chicory?—I think that the Treasury Minute is very good; I think it works beneficially.

2524. Mr. *Kinnaird.*] I understand you to say, that though your argument relates to coffee and chicory, you do not limit it to those articles?—No; it applies to every article.

2525. You say that adding innocuous adulterating substances to other articles with a view to reduce their price, is what you entirely justify?—Decidedly; I will take a case which is a still stronger illustration of my meaning than that which has been given; that is the case of isinglass.

2526. Does not such a practice indirectly increase the price of the genuine article?—I should say not; I think it would operate in two ways; I think the reduced price of the article itself would lead to an increase of the general consumption; that is to say, supposing chicory had never been introduced into this country at all, I believe you would not have had coffee now at anything like the price it is sold for; if coffee had not had to contend with the competition of chicory, I believe that coffee would be a much dearer article to the public than it is at the present time.

2527. Genuine coffee?—Genuine coffee.

2528. Viscount *Goderich.*] You said, did not you, that you were prepared to justify the mixing of chicory and coffee together for the purpose of reducing the price?—I proceed upon this assumption, that you are endeavouring to sell an article for 1 *s.* which is only worth 3 *d.*, or in that proportion. I say that if such a state of things did exist, it would right itself in a month in the ordinary course of competition in trade. There are as many chicory dealers in this country as there are coffee dealers, who would be quite as alive to the adulteration of chicory as any other article. I cannot admit competition in one article and deny it in another article, when there is nothing to make it an exceptional case.

2529. Do you think it is justifiable to mix chicory and coffee together, or to mix any foreign substance with an article which is about to be sold, and sell the mixture at the same price at which you would sell the genuine article?—Decidedly I do, provided the trade can get that price; but I do not believe that they can obtain an excessive price for any article.

2530. You do not believe, in fact, that the public can be deceived?—No; I think they are sufficiently protected by competition.

2531. Mr. *Kinnaird.*] At present?—At present.

2532. Viscount *Goodrich.*] Will you explain to the Committee how competition enables the public to know that an article is adulterated?—It does not; neither

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neither do I think it necessary that it should. I think it is sufficient for the public if they get the article, whatever it is, at the cheapest price. "What the eye never sees, the heart never grieves for," is the rule which I should adopt in reference to that.

2533. They do not get the article they wish for; they wish for one article and get another?—I think you may put an extreme case in theory which it would be impossible to answer. I believe it is unanswerable as a theoretical question. I admit the public ought to have that which they require, but I think practically it would be impossible to work it out, and if you did work it out it would be a great injury to the public.

2534. You said just now that competition protected the public; will you explain that opinion?—Competition leads to a reduction in the price of every article produced and sold, except those articles with respect to which competition has not its ordinary play, namely, articles which are sold under any monopoly. Now, in whatever state you get competition, and surely you get it in the articles which have been already mentioned to the fullest extent, the same thing which reduces the price of one article reduces the price of another unless it is exceptional.

2535. When you say the public are protected by competition, you do not mean to say that competition protects them against having articles sold to them which possibly are not what they ask for, but that competition leads to their having adulterated articles sold to them at a cheaper price than the genuine article could be sold at?—Yes; and if you could destroy the competition, instead of working a benefit to the public, you would be working the greatest injury, because you would be creating a whole host of small monopolies in genuine articles, which would so increase the price of those articles that it would place them beyond the reach of one-third of the population.

2536. Do you consider it would be creating a monopoly to leave competition between coffee-dealers perfectly free, and simply to remove what I should call a fraudulent competition by the admixture of chicory?—To a great extent I think it would. I look upon the coffee interest as I do upon any other interest which has any other brought against it.

2537. Monopoly, therefore, in your opinion, does not consist in a small body of traders having alone a right to deal in an article, but in a particular article not being open to be competed against by every other possible article which may be made to assume its appearance?—I think there are various means to be taken of competition; it acts in various ways. It is impossible to define its working in all its bearings. There is a wheel within a wheel in the very network of competition; you do not know how it acts; but certain it is that it acts, as far as one can see, beneficially to the public. What I say is this, that you may very easily interfere with the machinery, and put it out of gear by preventing competition under its natural circumstances being carried on, but you would have very great difficulty in restoring the trade to the same state in which it is at the present time; it is now working, and has been working great benefit to the public.

2538. You mean, do not you, that you are an advocate of unlimited competition; you think unlimited competition in many cases leads to the perpetration of frauds by traders for the purpose of underselling their competitors, but you approve so highly of competition, that you would not prevent those frauds?—I would prevent anything that is noxious and injurious to health, most rigidly; I would even as a mere matter of name concede that anything which is fraudulent to the public pocket should be prohibited, and I have included that also; not that I think it possible that a fraud upon the public pocket can arise, because I return to my original view, namely, competition. I fear that some of the suggestions which have been given to the Committee would interfere with a vast variety of articles which not only assist trade, but to a very great extent are the means by which competition is sustained, and the consumer procures his articles at the low price at which he does obtain them.

2539. That is to say, he procures a spurious article under the name of the article he asks for, and really wants?—There is nothing in a name; he procures an article which answers, according to my belief, the purposes for which the public require it, or they would not use it.

2540. *Chairman.*] The sale of sloe leaves under the name of tea, I presume, provided they are sold cheaply, you think to be no fraud upon the public?—I should

should say, as to an article of that kind, it can be usefully prevented; it would be desirable to prevent it.

2541. Where, then, would you draw the line?—I do not admit that sloe leaves mixed with tea should be classed with articles that would assist in competition; I assume that to be a fraud.

2542. Mr. *Villiers.*] Do I rightly understand you to state that there are two kinds of objectionable proceedings with respect to what we speak of as adulteration, and to call one injurious to health, and the other fraudulent upon the public pocket?—Yes.

2543. We understand what is injurious to health; what is it you mean by fraudulent as regards the public pocket?—When I explain the remedy I propose, you will see under both those heads how it will work, and that the remedy keeps pace with what I will call the disease.

2544. Can you give the Committee a general description of what you mean by frauds on the pocket?—Neither of the terms do I think it possible to define by legislative proceedings; therefore I am about to submit a remedy for the purposes of which it is not necessary to come to those conclusions.

2545. I collected from your evidence that you had in your mind two classes of things which ought to be prevented; one the mixture of ingredients which are deleterious with articles of general consumption, and another class of practices which are literally frauds upon the public pocket?—Decidedly.

2546. You have had in your mind that distinction?—Yes.

2547. You would prevent such practices?—Yes.

2548. Can you give the Committee any general idea of that class of articles in which fraud is attempted, or in which fraud is intended upon the public?—No, because it has been my aim and object to keep clear, in suggesting a remedy, of any definition of either the one or the other at the present time. I think you have such innumerable difficulties in the definition of adulteration, and in dealing with it by legislation, that my remedy renders unnecessary the consideration of either branch at the present time.

2549. What is the purpose of your remedy?—To prevent whatever may be deemed hereafter to come under the category either of adulterations injurious to the public health, or adulterations which are fraudulent to the public pocket.

2550. You appear to admit from your answer that those things do exist?—I assume them to exist. I should deny the fact that fraud upon the public pocket exists to any extent worthy of the consideration of the Legislature; but I think it would be advantageous, even though there may be no fraud at the present time, to institute what I would call a remedy which would do no harm if it does no good; it would do no injury, though the fraud did not exist.

2551. You have expressed an opinion upon this subject; will you state upon what extent of experience it is founded; you say you do not think those frauds are practised extensively?—I have no experience of my own to speak from, further than what is already before the Committee, from the evidence of some gentlemen who have had greater experience, perhaps, than anyone else in the country. I particularly refer to the evidence of Professor Redwood upon the subject of drugs.

2552. Professor Redwood gave the Committee evidence of the result of his analyses in cases where things were brought to him; have you any experience as a consumer, or have you made any general inquiries as to what the practice is in shops?—No.

2553. Can you tell us at all the extent to which the practices exist which you seem to admit to a certain degree?—I only derive my experience from what knowledge I have of the trade. I believe it is not the interest of either the producer or the seller to produce or sell, as a general rule, adulterated articles.

2554. What trade are you connected with?—I am a solicitor, myself. I am chairman of the Local Board of Health at Leamington.

2555. You are not in trade?—No, except to this extent; I have been connected with a patent, which was taken out some time ago by my brother-in-law, which has given me a greater knowledge of trade than perhaps other people in my position would have.

2556. What was the nature of that patent?—It was a substitution for isinglass; that gave me a knowledge of the very article I was about to speak on.

2557. Would that you inform you about other articles than isinglass?—It would inform me of this: the article which it was my interest to introduce upon that occasion was a substituted article for isinglass, namely, gelatine. In that

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case we had to meet with all the difficulties which could be raised in the trade, and that brought me into a knowledge of everything connected with the sale of an article under a substituted name.

2558. Was this patented article to be sold as isinglass?—Yes, it was always sold under the name which was given in the patent, namely, Patent Refined Isinglass.

2559. Not being isinglass?—The patent had two objects; the refining of isinglass, and also the refining of gelatine. From both it produced what has been admitted by every professor in the country almost (because it has been the subject of litigation to an enormous extent) to be an article superior in every respect to the foreign article, and having all the constituent elements of it.

2560. Your experience refers to the difficulties of substituting an article for one which is already in demand, the substituted article bearing the name of the other article?—It bearing the name of the other article.

2561. You can tell us the difficulties of passing off what perhaps are not adulterated articles, but fictitious articles, bearing a name they do not properly bear?—I believe, if an article is substituted in a trade which has advantages over one already in existence, there is at the present time no difficulty in effecting a sale of that article; but if, on the contrary, an article which is inferior is substituted, I believe it would be totally fallacious, and perfectly impossible, to carry it out to any extent.

2562. If it were possible it would be profitable to the inventor, would not it?—It might be profitable, but I think it is perfectly impossible.

2563. Did this patent of yours succeed?—It did succeed; it is now in existence; it has supported about 70 men; it has produced a home consumption in place of the foreign article; it has stood the test of two trials at law, and it has reduced the price of the foreign article to a very extraordinary extent.

2564. Mr. *Kinnaird.*] Patent refined isinglass is the name of your article?—Yes.

2565. Are you aware that gelatine does not contain the same properties as isinglass?—On the contrary, it does. I have the report of Professor Taylor and Professor Brande on the question. Isinglass ought not to contain anything but pure gelatine; in point of fact, isinglass was gelatine in the purest state then known; that is, the bladder of a fish; gelatine, it has been found, could be manufactured still purer and still stronger than that.

2565*. Still it is not isinglass?—Isinglass is gelatine in its purest state.

2566. Mr. *Villiers.*] Why then did you prefer calling it isinglass, instead of what it really was?—Before that article was introduced, an article of a very impure quality was introduced under the name of gelatine, which it would have been impossible for any person to sell as isinglass. That, therefore, is a case in which an article may be beneficially introduced under a substituted name.

2567. You do not deny the fact, do you, that inferior articles are sold much in the same way as gelatine is substituted for isinglass, in the case of your patent, and that people derive a benefit from it?—Yes, I do; I will show you the fraud that was attempted to be practised upon the isinglass trade before the patent was taken out.

2568. Do you doubt that people do put very inferior articles into the things they sell, and derive a profit from so doing?—I think if the practice does exist you may apply the most simple remedy which will prevent it; I could not speak from my own experience on the fact whether such things exist or not.

2569. Viscount *Goderich.*] Is there any difference in price between genuine isinglass and gelatine?—If you get the gelatine pure there would not be the same difference in the price; there is bad isinglass as well as gelatine. There is a bad description of isinglass which is ten times more filthy than the worst description of gelatine, because, looking at the groundwork of it, namely, fish, if it is not pure, it is more impure than any gelatine could be. The worst description of isinglass has been referred to as genuine, and may be genuine, but it is genuinely bad, and it is worse than the worst description of gelatine.

2570. I presume no system of inspection or interference which might be contemplated could diminish the consumption of this article which is produced by your patent, could it?—If you were to compel persons to sell that article under an impure name, which the public have a distaste for, my impression is, that you would interfere with it.

2571. You do not call gelatine an impure name, do you?—The term "gelatine" did

did not stand well till the invention to which I refer had brought it to the perfection to which it is now brought.

2572. *Chairman.*] You need not call your patent article gelatine unless you like it; you might invent a Greek name for it, as is sometimes done, and obtain a sale for it under that name?—You could not have obtained Russian isinglass at the present time under any circumstances at its usual price; there is a limited supply, and you would have had to give a price for it one-third in excess of the present price; therefore, when all the authorities I can give you show the advantage of this article as a superior thing, it is a question whether you should not admit it to be sold in the freest possible way.

2573. That being so, does it not occur to you that the price of isinglass having greatly risen, on account of the war with Russia, it would have been possible to have introduced your gelatine under its own name or under some name which did not imply its being isinglass, and to have induced the public to take it as a substitute for isinglass, which has so greatly risen in price?—The fact is this, that the name isinglass, in itself, represents nothing; it is merely an article sold, which is taken from the bladder of a fish, which contains gelatine, which is denominated isinglass; and any person in the 19th century has as much right to take the same gelatine, which is equally pure, and even better in all respects, and call it isinglass, as a person in the 13th century had to take a fish's bladder, and, for some reason or other, give it the name of isinglass.

2574. Surely, the word having acquired a distinct signification, and the term "isinglass," whether it be arbitrary or not, implying a fish's bladder, you do not think that anyone can properly sell another article which is not a fish's bladder, and call it by the name of isinglass?—Unquestionably I do; there you give rise to what I term competition; if you prevent that class of dealing, namely, the substitution of articles, you strike a blow immediately at trade and at competition, which is the nucleus of trade. I put this forward as an instance of my views, that you ought to allow pure and superior articles to be sold under a substituted name, because they assist in competition.

2575. Then, I presume you would permit gold and silver ware dealers in this country to sell a mixture of brass and gold, and call it gold, provided they sold it at a much less price than the gold article itself?—That is an exceptional article, and has always been so.

2576. The principle appears to be the same, and in many branches of that trade there is now nothing exceptional?—Gold represents a standard value, and you cannot interfere with that standard value without materially interfering with other interests of the country.

2577. Does not coffee represent a standard value; does not it represent coffee?—I think it does not represent a standard value; if you have pure gold you know the standard value which has been affixed to it.

2578. I suppose a dealer in coffee knows the standard value of Mocha coffee, or coffee from the West Indies or the East Indies?—There is a wide difference between what might be termed the standard value of coffee, and the standard value of gold.

2579. Is there any wide difference between the substance of coffee in different places; is not coffee always coffee?—There is good coffee and bad coffee; it differs in degree as to price and value. If you had coffee of equal value, and you could regulate the price of that coffee, and wished to do so, you would have this state of things: you would have a state of things fixed and certain; but the very nature of coffee and other articles is uncertain and indefinite.

2580. It is not uncertain *quà* coffee, is it?—I think it is. I think its difference of quality renders it so.

2581. The standard is not a standard of quality, but it is a standard as regards the article itself; coffee is always coffee, and isinglass is isinglass?—Certainly.

2582. Mr. *Kinnaird.*] You stated that gelatine and isinglass are the same?—Yes.

2583. I have understood from good authority that the difference is this, that your patent gelatine after boiling several times loses its quality and its power of gelatinizing, whereas the real isinglass does not do so?—It is wholly a mistake.

2584. Why is it that a brewer does not buy gelatine, and does not use it, but buys and uses the isinglass, which is a dearer article, for his process of brewing?—It is the very strongest illustration of my argument; isinglass is suited for two purposes; it is suited for dietetic purposes, and it is suited for fining. Now the

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quality of isinglass which is suited for food is not suited for the other purpose. It is the very highest qualities of isinglass which are selected for confectionery and dietetic purposes, and the very poorest for brewers. A brewer would never think for a moment of buying the highly priced article.

2585. Mr. *Villiers.*] Did you hear Mr. Redwood say, that one adulteration practised was putting a layer of gelatine between two layers of isinglass?—He says that has ceased; it has not occurred since this invention. This (*producing the same*) was the best article which could be produced in gelatine before our invention; it is nothing but glue.

2586. Before your invention it would not have been safe to call gelatine isinglass?—It was not done; they sold it as gelatine, because they could not get a better name for it.

2587. Your principle of calling a thing by the name of another thing which is in considerable demand would not apply till you had purified the substituted article to such an extent that it is really useful to the public?—Decidedly; competition does that, and trade does that.

2588. In whose discretion is it to determine whether the fictitious article is of that kind that you may call it by another name?—I think the public taste is the best judge of that.

2589. The inventor starts by calling it by that name?—He starts by calling it by the name of that which it most nearly resembles; it would be a perfect fallacy for him to call the inferior article by the name of gelatine.

2590. Supposing in a window those two articles were exposed, would there be any harm in calling the inferior one isinglass?—It would not sell; that introduces the impossibility of legislating in matters of this kind; you must sell an article by the name of that which it most nearly resembles; that very much affects the question whether you are to support the ingenuity and industry of the country.

2591. Mr. *Kinnaird.*] I have heard that gelatine is the result of boiling the tissues, whereas isinglass is the natural tissue which has undergone no boiling?—I can state, most unquestionably, that that is not so. Professor Brande wrote upon gelatine, and described that as the product. The moment this invention came out, and Professor Brande saw it, he said, "I know we are wrong; I know the theory of all chemists is wrong; gelatine is an educt, and it is not a product." That is the opinion of Professor Brande, Professor Taylor, and also of Mr. Cooper and Mr. Phillips, who are dead, and, I believe, Liebig has recorded the same opinions.

2592. Mr. *Villiers.*] You admit that some things of this kind are attempted which are objectionable, and your remedies would reach them, though they would not touch the question of isinglass and gelatine?—They would not touch any case in which the practice was a benefit to the public.

2593. Mr. *Kinnaird.*] Whether it is educt or product, is not it true that gelatine is obtained by boiling tissues?—Certainly not.

2594. You do not obtain it in that way?—No, not by boiling.

2595. Mr. Alderman *Cubitt.*] Supposing a specimen of your refined gelatine and of Russian isinglass were submitted to a chemist, and he were to analyse them, would the results of the two in all respects be identical?—They would be in favour of our article.

2596. That is not an answer to the question; would the results be identical; I understand your principle to be this: There are certain substances which are well known by certain names; if you can find substances anywhere else identical with those substances, you are justified in using the name by which the first substances went. In the case before us, are the elementary substances of your refined gelatine precisely identical with the elementary substances of isinglass?—Precisely; less the impurity which the Russian isinglass has, which ours has not.

2597. In point of fact, have those specimens ever been submitted to a competent analyst?—Twenty times.

2598. Can you tell us what the elements of either the one or the other are?—Both are gelatine.

2599. Is gelatine one single element, or is it a compound?—It ought to be gelatine, and nothing but gelatine.

2600. Gelatine, in fact, is an elementary substance?—It is.

2601. Containing nothing else?—Containing nothing else.

2602. The elementary substance of isinglass and of gelatine are perfectly identical, are they?—Precisely so; and the Russian isinglass ought to be nothing else

else but pure gelatine; it is pure gelatine, and something besides; but it was the purest state of gelatine known before this discovery. Now they have separated the gelatine and produced a purer product; but, in fact, the two names are synonymous.

2603. *Chairman.*] Do you mean that the word isinglass means gelatine?—Isinglass ought to contain nothing but gelatine.

2604. You do not mean to say that isinglass means gelatine in point of terms?—I take a fish's bladder and purify it, and take every insoluble property out of it; I reduce its weight, and am to that extent a loser; having purified that, I am as much authorised to call it isinglass as I was before it was purified.

2605. Is it made of the same substances as isinglass?—Yes, precisely.

2606. From a fish's bladder?—Yes. The same principle applies to a thousand things which are not brought before the Committee. Therefore it would be legislating upon a matter when half the substances to which it applies have not come under your knowledge at all.

2607. Do you mean to say that there are many things sold under another name which contain the precise elements of the article the name of which they assume?—I think there are a variety of things which might be placed in the same category.

2608. You do not know as a fact that there are?—I do not.

2609. You would not say that it was the same in the case of coffee and chicory?—No, I must put that on a different ground. I think the Legislature has sufficiently distinguished in that case. The danger I anticipate is the destroying competition between the foreign product and the home production, when the home production is rendered by ingenuity superior to the foreign article.

2610. What are the remedies which you would suggest?—In order to elucidate my principle, I would say, that the first difficulty you are under is to define the term "adulteration" in an Act of Parliament, so that the Executive shall know what the term means. I submit that the term is perfectly inapplicable. It is so extensive and undefinable that it is impossible to bring it to any degree of certainty upon which you could safely proceed. Therefore, in order to get rid of that difficulty, I propose to give powers to the Treasury, or to the Board of Trade, or any official department, from time to time to prohibit the sale, and use, and manufacture, or the importation of articles coming under those categories, or which in their opinion do so.

2611. Viscount *Goderich.*] What categories?—In injurious adulterations or frauds upon the public. I name the Government as the parties to do that, because you would then always have a responsible body, and they can from time to time, as circumstances require it, call to their assistance the best information for the time being. If you appoint a Board of Examiners or a Commission, they may be very able to give opinions to-day, and they may be very unable to do so to-morrow. They may upon some subjects have sufficient information, and upon other subjects they may be entirely at a loss. Therefore I say that by the means I suggest you would get an elasticity which would enable the Government to work with the times and with the subject which would have to be brought before them; by that means you can determine from time to time what you will prohibit, and what you will think unworthy of being prohibited. Having that Treasury Minute, or that Minute from the Government, that such things should be prohibited, the next thing will be to ascertain how you can detect them practically, and how you can prevent them. The means which have been hitherto suggested have been the appointment of inspectors, and I will draw the attention of the Committee to the disadvantages of inspectorship. I propose to refer to the plan suggested by Dr. Hassall; there we entirely disagree upon the theory. Dr. Hassall must consider, in his view of the remedy he suggests, that it is the interest of the trade to manufacture and sell, and to import, adulterated articles; he must proceed upon that basis, otherwise the inspectorship would not be necessary. Now I entirely and wholly deny that theory. I say it is wrong and unsound; and I arrive at that conclusion in this way: you have hitherto never imposed any restriction except that of the Excise for a particular object upon manufacturers, or importers, or sellers; you have allowed them to sell what they please; therefore if the trade has got into an unhealthy state, I do not say that there ought not to be a sufficient restriction and protection. No doubt you ought to protect the fair trader and the manufacturer in the manufacture of genuine articles, or articles which, for the purpose of definition, are genuine; if you protect the seller, it is the interest of both to manu-

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facture and to sell genuine articles, and if you once enact a law, the trader will protect himself; you will get a much better inspectorship through the trade than you can devise by any other means. I will instance pickles. The Government think it undesirable that pickles should be adulterated with colouring matter, and they order that it shall not be done; it then becomes not the interest of the trader to manufacture them. It may be that the public taste may continue, that they would prefer colouring matter, but the trader says, "I am not allowed to do that, and I will prevent anyone else doing it." Messrs. Crosse and Blackwell, for instance, have determined not to colour their pickles; their pickles go throughout the country; they have three or four travellers; their directions to them would be naturally these: "If you see pickles which are coloured, let us know of it, and we will prevent it; we will not be competed with by such articles." Therefore the matter will work its own cure. If you once adopt the remedy of prohibiting what you wish to prevent, the trade and the public are naturally the parties to prevent the producer being competed with by adulterated articles.

2612. Mr. *Villiers.*] Do you agree with Dr. Hassall as to the appointment of inspectors?—No, I differ from him.

2613. Will you state what means the Government should resort to, to detect those frauds?—It is to the interest of the traders to protect themselves, and I refer to Mr. Redwood's evidence as to the formation of the Pharmaceutical Society to protect the drug trade. I can also refer the Committee to the evidence taken before the Committee of the House of Commons with reference to the beer trade; Mr. Hanbury was examined; he said that the brewers did all in their power to prevent adulteration, and he did not believe that to any extent there was adulteration. I have ascertained it to be the fact that a great many brewers have the power whenever they please to enter any cellars of publicans whom they serve. I quote this to show that it is the interest of all trades to protect themselves as far as they can.

2614. That only shows, apparently, that the brewers are interested, and the publicans not; does it?—The same thing would apply to every article which is manufactured; where one person is prohibited from doing a certain thing, or will not from conscience do it, he will prevent other persons doing it.

2615. Viscount *Ebrington.*] If he has the means of preventing it?—Yes, if he has the means of preventing it.

2616. Mr. *Villiers.*] What would be the means you would take to detect the frauds?—In the same way that you establish every fact which is now required to be established as a fact; and here I must remind the Committee that the means have been simplified recently by the Common Law Procedure Act and by the county courts. As far as chemical analysis or the use of the microscope goes, they will be extremely useful to assist the Government in determining what shall be used and what shall not; but as a means of determining facts, in the numerous instances which would occur both in town and country, they would be perfectly inapplicable. The means I would suggest would be to permit interrogatories to be filed, as against any person selling atricles prohibited, and he must answer upon oath any questions put to him through interrogatories.

2617. Who is to file the interrogatories?—That I have provided for. I would not allow interrogatories to be filed till a *primâ facie* case of adulteration has been established; and I would, in the first instance, instead of having recourse to an inspector or an informer, see whether the trade would not work its own remedy. My belief is that there would be an ample number of people to file interrogatories, and put the machinery in force. For instance, the Board of Excise, according to the evidence of Mr. Phillips, have actually put a stop to or crushed various adulterations, and they no longer exist. Precisely the same thing would happen if you give the means of prohibition and prevention. Every man interrested in the manufacture or sale of a pure article will himself put the law in force as against his competitor selling an impure and adulterated article.

2618. You would leave your machinery to work by such means as that?—I would leave it to work entirely by those means; I think it would be the only possible means of arriving at the result.

2619. You say at first the Treasury are to issue a Minute prohibiting the sale or import of certain articles which are suspected to be adulterated?—Yes.

2620. Then you would say, under that law or resolution of the Government, that those things shall not be sold or imported?—Yes.

2621. Further, you say some person interested in the trade, or the person himself

self who adulterates, is to enforce the Treasury Minute?—Yes, I think that would be found to work its own cure; if it did not, then you might have recourse to the Excise as a body, or to informers.

2622. You do not give us a very perfect view of your form of procedure; the Treasury may issue a minute, and you cannot draw an indictment or an information upon it, can you?—Decidedly; they would issue their Minute prohibiting the use of certain articles that would be gazetted, and in that particular way it might be acted upon. We must start upon this basis; every article has its use; you cannot in an Act of Parliament legislate that such an article must not be sold, because in 99 cases out of 100 you would be legislating against the use of an article, whereas you only want to legislate upon the abuse of it.

2623. One knows how the Board of Inland Revenue proceeds, and one knows what power they have specially, and therefore, if any Minute is issued referring to any practice which has reference to the revenue, the Excise can proceed; but suppose there was a special Minute to say gelatine shall be no longer called isinglass, and shall not be sold as such, there would be no power of filing an information against a trader who sold that as isinglass which is not isinglass?—I would give that power by an Act of Parliament; you would have an Act of Parliament authorising the Government to do this; you must have an Act of Parliament setting in motion the machinery.

2624. You are going to create some new offences; therefore you must create some new mode of detecting them, and convicting the parties?—Yes, through a Treasury Minute, or by an order of the Board of Trade. I would give notice of what were the articles which were desired to be prohibited.

2625. You do not propose that any public officer, for instance, an Excise officer, should make inquiry into all those new cases you are going to mention, and institute proceedings, as is the case with the Excise?—No.

2626. You would leave it to any person to take proceedings?—It should be the duty of the Government to make such inquiries as may be necessary, and for them to rescind, vary, or alter their Minutes as circumstances may require; it would compel the Government, in the first instance, by their Treasury Minute, to determine what articles should be allowed, and what should not, or rather to determine the negative, what articles should not.

2627. Viscount *Goderich*.] Having got so far, the Government having issued those Minutes, how would you have them acted on?—I do not think you would have to create any new officer at all; I think it might be attached to the Patent Office, or any office which could take the ordinary duties of a registrar. If there is any in existence, it would not be necessary to create one; all that would be required would be a register merely as a machine; the Government having decided what they would prohibit, it should be the duty of the registrar, upon a sufficient case being made, to direct interrogatories against the person.

2628. Is he to take evidence?—No, I would leave that between the parties.

2629. You said he was to have sufficient evidence laid before him to set him in motion?—I think the trade is quite sufficient for the purpose; suppose you prohibit the sale of a mixture of coffee and chicory under any circumstances, there are quite sufficient persons in the coffee interest to prevent any parties selling coffee and chicory mixed.

2630. That is found to be the case now, is it?—I think it has worked its cure.

2631. You think the coffee interest is sufficiently protected by it now, do you?—Decidedly, I do.

2632. Have the coffee interest obtained an information against any member of their own trade?—I think the instances are so few in which abuse takes place that there is not a necessity for it, and as the evil does not arise, a remedy is not necessary.

2633. Viscount *Ebrington*.] You believe that adulteration with chicory, in the case of coffee which is sold as pure, is of very rare occurrence?—Of very rare occurrence, indeed. I am guided in that belief by the evidence of Mr. Phillips, the other day, and that strengthens my opinion, that every article would work in the same way. For instance, I am perfectly satisfied, with reference to the patent refined isinglass, if you were to prohibit that, the persons interested in Russian isinglass would in one moment put the law in force. If any person were to introduce an article which was injurious to any other person's trade, and the law prohibited it, he would be the best person to protect himself and the public.

2634. Mr. *Villiers*.] Have you any other remedy to suggest?—Having deter-

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mined what should be prohibited, and having directed interrogatories through the means of the registrar, the person must either confess or traverse. In answering upon oath, he must either admit his guilt or maintain his innocence. I say, in such a case, it would be unsafe for him to deny the truth, because there are his men; there I would give the very strongest powers. If you have a *primâ facie* case for instituting the interrogatories, I would follow that up by giving power to the officer to inspect the premises, to inspect the books, and to examine witnesses.

2635. *Chairman.*] What officer?—The officer who would have charge of the minutes.

2636. The registrar?—The registrar, or any person the court might direct; because you must then bring it into a matter of issue between the parties; you must by that means get at the fact of guilt or denial. If it is admitted, which I have no doubt in 99 cases out of 100, if it existed to any extent, it would be, I would then proceed by an injunction prohibiting it.

2637. Prohibiting what?—The injunction should be against the party doing it; and if he should do it again he would be subject to contempt of court; and I think you would find that a much more effectual remedy than information or exposure.

2638. Viscount *Goderich.*] Before what court would you take it?—The common law courts have now the power of issuing an injunction. It was a suggestion of my own made to the Committee of the House of Lords upon the Patent Laws. You may even have it extended to the county court if you like; but I say that an injunction and a contempt of court is a much stronger remedy and a much safer one to rely on than a fine would be, or any exposure by the publication of the names of the parties.

2639. Mr. *Villiers.*] That completes the machinery for detecting and punishing, does it?—If it is not denied, I would then have an issue directed by the county court, and let it be tried by a jury.

2640. Viscount *Goderich.*] Supposing the party is found guilty by the jury, what then would happen?—The injunction would proceed in the same way. I will give you an instance of the fallacy of relying upon exposure; you would have everybody exposed once, and then the remedy is gone; no one cares anything about it beyond that. The "Lancet" took up the question of isinglass and gelatine; not one of the shops cared about it. They said, "We know we are selling purer articles than anyone else." I advised my relative to go to considerable expense in getting the result of Dr. Taylor's opinion upon it. The report, however, was never sent out, and that was the reason no one cared anything about it.

2641. Mr. *Villiers.*] You think exposure will not be sufficient, and you would require penalties?—I would have a prohibition. I would not look upon it as a punishment. If a person went on selling the adulterated article it would be looked upon as a contempt of court. You may have people paying fines over and over again, and they would continually recur to the same thing. It answers their purpose to do it; but among all the injunctions which have been issued by the courts you have rarely heard of an instance in which they have been disobeyed.

2642. Viscount *Goderich.*] Under that mode of proceeding you would have to prove two instances of disobedience?—I think it is necessary under any circumstances that that should be so. I do not think you would sufficiently protect the producer of an article by any other means.

2643. Mr. *Villiers.*] How would this man clear his contempt?—By satisfaction to the court that he would not do it again.

2644. What this injunction is to do, is to tell a man not to sell those adulterated articles any more?—That would be the case.

2645. If he is found to do it he is in contempt?—Yes.

2646. The ordinary course is to imprison a man under those circumstances?—Yes.

2647. How is he to get out of prison?—By going to the county court, and giving it a sufficient satisfaction that he will not do so again.

2648. Does your plan include what shall be the satisfaction?—No, I leave that in the discretion of the judge. Supposing a person is now infringing a patent, or doing any act injurious to his neighbour sufficient for the interference of the court, the court has the power of issuing an injunction to take care that its orders are supported.

2649. Viscount *Goderich.*] How is the court to ascertain if he abuses the injunction or not?—The same machinery that set the law in force in the first instance will keep its eye upon him in the second. My objections to inspectors are these: it is such an expensive machinery, irrespective of its objectionable nature to the trade of the country. The trade would say it would be intolerable to have an inspector continually looking after them.

2650. Mr. *Villiers.*] The plan which has been suggested is, that there should be inspectors who should not be active in their inquiries, but should be bound to analyse articles when they are submitted to them?—I do not think it is a good mode, in so large a subject, of ascertaining the fact. I will undertake to say, and I have had some experience with scientific men, you will not get two such men to agree upon the same subject; you would get into such a labyrinth of difficulty in carrying out the machinery that it would be impossible to work it.

2651. Then how is the Government to know what articles they shall prohibit?—It is a very different thing to ascertain it once, and then make the prohibition, from having to be continually using it as a means of detection.

2652. What is the evidence of an article being adulterated?—Evidence of fact.

2653. How is the fact to be got at except by means of analysis?—It is better to ascertain it by interrogatories and by a personal examination of the trader's books and of his workmen.

2654. Viscount *Ebrington.*] Better than by an examination of the articles he sells?—Decidedly.

2655. Viscount *Goderich.*] Would you propose that there should be no examination by way of analysis?—Only in the way of assisting the Government as to what they should prohibit; and only for the purpose of assisting the parties in extreme cases when they cannot ascertain the fact in any other way. The mode of determining the question scientifically by analysis or by the microscope is the most satisfactory that can be adopted; but it is better to ascertain the fact by other means, and use them as the last resort.

2656. Mr. *Villiers.*] Supposing the trader is asked himself whether such adulterations are in the article he sells, and supposing his men are asked, and they both deny it; some one else may have adulterated the article which he sells, and he may conscientiously deny that he has adulterated it; but it might be equally the fact that there was adulteration, and would not that be discovered by chemical analysis?—By my mode you may put this question to him: "From whom did you have the article?"

2657. We hear, for instance, that beer is first weakened with water and then strengthened by some deleterious article; it does not follow that the publican or a man in his house should have put this article into the beer, but yet it is there; what use would there be in interrogatories in such a case?—You would have the benefit, in the first instance, in a kind of an oath registered against the person, and he would be amenable if he spoke untruly.

2658. Viscount *Ebrington.*] Would not he be speaking the truth in saying that he had not adulterated it?—You might follow it up by another question: "If you have not, who has; from whom did you have the article?" The great effect of this system is, that it will be working its own cure.

2659. Mr. *Villiers.*] Would not it lead to an organised system of adulteration, so that no man should ever do the act himself, but some one for him?—Decidedly not; there is a difficulty in tracing it to any extent.

2660. Viscount *Ebrington.*] Has not there been difficulty, in cases of bribery, in tracing the commission of the act in consequence of the convenient absence abroad of some one necessary to the proof?—That is an exceptional case.

2661. Mr. Alderman *Cubitt.*] Take the case of bread. Parties found bread which had alum in it; the baker denied it; they went to the baker and examined his stock, and they found it in the flour; the name of the miller was published; the miller denied it; they pursued the matter further, and they found that the miller was in the habit of purchasing small quantities of flour from France to give colour to his flour, and the alum was there. In that case the baker and the miller might conscientiously have sworn that there was no such thing. All that Dr. Hassall found out in the case of your isinglass was, that it was a manufactured article, the elements being precisely the same?—That was found out long before him.

2662. *Chairman.*] Does he allude to it?—Yes; Dr. Hassall cannot distinguish

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between a gelatine produced from a fish, and pure gelatine produced in any other way.

2663. Did he find out the difference; did he state as a fact that he had purchased that which was sold as isinglass which proved to be gelatine?—That still further shows the absurdity of relying upon the microscope or upon analysis; the very test which Dr. Hassall gives for his reasoning upon isinglass, Dr. Taylor, who is an equal authority, wholly denies and repudiates.

2664. Mr. Alderman *Cubitt.*] In this case it appears that Dr. Hassall was right?—The very instance, and his reasons for it, Dr. Taylor wholly denied.

2665. Was not it the fact that Dr. Hassall discovered that yours was not the fine isinglass produced from a fish, and if he did discover it, how did he do so, the elements being precisely analogous?—He would find it out from the fact that the original isinglass contains impurities which the other does not; he would find it out by the plus or the extra; the difference is open to the eye; no one would be deceived; but the difficulty is this, almost every statement which is contained in Dr. Hassall's book is denied by men of equal authority with himself.

2666. You would establish, would you not, an inquisitorial court, and oblige a man to answer and to confess that he has been infringing the law?—I think the trade generally throughout this country would greatly prefer the protection which would be given to the fair trader by my plan than by the other. I think the whole thing would work its own cure without any inquisitorial machinery at all; the trade would very much sooner have interrogatories put to themselves than be subject to the continual annoyance of inspectors over whom they have no control.

2667. Mr. *Villiers.*] Are not you going to establish an inquisitorial system, calling upon a man to do that which he is never required to do now, namely, criminate himself?—I think the remedy would work the cure.

2668. That is your plan?—Yes, but I should not call that inquisitorial; I say that no interrogatories should be established against a person unless a *primâ facie* case had been made out.

2669. You are asking a man to criminate himself, are not you?—It is not what we should view as crimination; it is what you would be entitled to ask of a person now in the case of an infringement of a patent. You are not enacting anything which has not been done before.

2670. Viscount *Goderich.*] Do not you think that the system would lead to a great deal of perjury?—I think not. It was supposed when the law was altered, allowing a person to be examined in his own case, that it would increase perjury, and I believed many of the judges entertained the same opinion. I think that opinion has changed; the same objection does not now apply as when it first came into operation.

2671. Mr. Alderman *Cubitt.*] You are quite aware that no man is now called on to criminate himself, and no one is permitted to be asked a question which might lead to it?—I do not view this as a matter of criminality to the same extent; I do not think it would be carrying the law further than it now exists. You have clearly the power to put interrogatories in some other matters which would lead to precisely the same result. If it were proved against a person that he was infringing another man's patent, an injunction would issue, and you would have power to ask that man such a question.

2672. Viscount *Goderich.*] Did not you say that you were prepared to endorse the evidence of Mr. Phillips?—I think in the main principles I do concur with him.

2673. Do you concur with him in thinking, that the object of a great many of the adulterations is to enable the retail dealer to get a profit?—I think it leads to competition.

2674. Mr. Alderman *Cubitt.*] Would not there be exactly the same objection on the part of traders to answer those interrogatories truly, that it is notorious there is on the part of traders to answer questions put to them by the Income Tax Commissioners?—Mr. Phillips restricted his opinions to the question of price. I do not think you need interrogate the trader at all as to his price or his profits; the question would be one of adulteration, and not of price. With respect to Mr. Phillips's views as to inspectors, he gave you a very strong illustration of the nature of the duty required of them, and pointed out the difficulty in obtaining men sufficiently qualified. He said you would want a man not only thoroughly versed in the theory of chemistry, but you must have a practical man. In that way

way it is I say you can never get a man with sufficient practical knowledge combined with sufficient scientific knowledge.

2675. Viscount *Ebrington.*] You think the evil would work its own remedy, and the interest of the honest trader would sufficiently protect the public against the dishonest trader?—That is entirely my opinion.

2676. There is a law now, is not there, against false weights and measures?—There is.

2677. Is it the fact that the interest of the honest trader is quite sufficient to protect the public against false weights and measures without the intervention of any other authority; are the inspectors of weights and measures always set in motion by honest traders, and are those who use short weights and measures always punished in consequence of the exertions of honest traders, or is the punishment of those persons more generally the result of the interference of the inspectors?—The interference of the inspectors; but I think that is a wholly different class of inspectorship to that which I propose to substitute.

2678. I am not dwelling upon the question of the qualifications of the inspectors, but I am referring to your opinion, that the interest of the honest traders would be found, without any extraneous assistance, sufficient to protect the public against the practices of the dishonest traders?—I am not aware that it was ever tried, or that the law was ever allowed to work its own cure.

2679. Practical y do you think it would do so?—I do not think the case is analogous to this case, for this reason: weights and measures are detected by the fact of their being on the counter or in the possession of the individuals, and in all probability in those few instances you find two sets of weights and measures. In articles of food the prevention will not so much lie with the retail dealer as with the manufacturer; it is the manufacturer you want to discourage; it is through him the Excise now work; they could not, with their small staff, at all compete with adulterations and prevent the substitution of articles injurious to the Excise, except they attacked the practice at its root, namely, the manufacturer.

2680. I understand you that the detection of false weights and measures, and conviction for the use of them, being much easier than the detection of adulteration and conviction for adulteration, you are of opinion that though in the case of weights and measures the public require extraneous protection beyond that afforded them by the interest of the honest trader, they would not require extraneous protection in the case of adulteration?—I think not; I think the two cases are very different. It is easy for any person of ordinary talent and knowledge to find out whether weights and measures are false or not; it would be very difficult to get any staff of officers with sufficient information to ascertain, from the use of the microscope or chemical analysis, the condition of all the articles you might put before them. There is one point which Professor Redwood spoke to, namely, the adulteration of gin; the adulteration of gin and spirits was under the consideration of a Committee of the House of Commons some time ago; a great deal of evidence was taken upon the question of the adulteration of spirits, as sold to the consumer; I know that the weight of evidence, and, I believe, the Report of the Committee, in almost precisely the same state of things which now exists, was against any interference with the adulteration of spirits; it is an important thing that a witness here should be confirmed by what took place before another Committee.

2681. Mr. *Villiers.*] That was not a Committee upon the question of adulteration?—The question of adulteration arose most strongly; it was a question which was asked of almost every scientific witness, and they all gave their opinion very freely.

2682. *Chairman.*] With regard to the remedies you propose, is there anything else which you wish to state?—I observe, on looking over my notes, that there is a point to which I should particularly wish to draw the attention of the Committee. My plan does not in any way interfere with your afterwards legislating in special cases; and I anticipate that there would be some points which you would have specially to legislate on. For instance, with regard to important articles of confectionery, and anything which the general remedies would not meet, special remedies might be devised to meet. You would start with a general principle, and you would put a stop to the great adulterations, by what I may term the general law, leaving other cases to be specially provided for.

John Postgate, Esq., called in; and further Examined.

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2683. *Chairman.*] YOU are a Fellow of the College of Surgeons, are you not?—Yes.

2684. And also Lecturer on Anatomy at Sydenham College, Birmingham?—Until recently I lectured on anatomy; at present I am lecturing on Forensic Medicine at that institution.

2685. Have you any observations to make to the Committee in addition to those which you made on a former day?—I have had four samples sent to me from Wolverhampton by Mr. Alfred Hall Brown, a solicitor at that place. They consist of two samples of bread and two samples of flour; in each sample I find alum more or less, both in the flour and in the bread. A sample of tea was sent a short time ago from the same town, which contained beech leaves and catechu. The tea itself had evidently been divided, and there was not an entire leaf in the sample.

2686. Mr. *Villiers.*] Has any society been formed at Wolverhampton, of which Mr. Brown is the head?—There is a small committee established at Wolverhamptom, consisting of Mr. Edwards, a surgeon there, and Mr. Colman.

2687. In connexion with a larger society at Birmingham?—In connexion with myself. The article of mustard has been alluded to. In working this movement I have sometimes curious applications made to me. A person made an application to me some months ago respecting the establishment of a mustard manufactory in Birmingham. He stated that the difficulties in the way of establishing the sale of genuine mustard were so great that he was afraid to establish his manufactory. The question put to me was this: "Would I advise him to begin to manufacture genuine mustard, or to manufacture the adulterated article like the rest of the manufacturers?" Of course, my advice to him was to conduct his business in an honest way, and to meet the difficulties as best he could. I offered my aid to him to see the medical men in Birmingham, and to endeavour to secure a sale for his mustard among the profession. The pure article has a very different appearance from the adulterated article. The pure article has a dead yellow appearance. The article adulterated with turmeric has a bright appearance. This gentleman states in his communication to me that the adulterated mustard is sold at 4*d.* a pound to the retailers, and he could not supply the genuine article at that price, but he could sell the genuine mustard to the public for the same price as the adulterated article is sold at by the retailers. Adulterated mustard is sold to the retailer for 4*d.* a pound, and to the public at 16*d.* a pound. He could sell the genuine article to the retailer, but not at the price now paid by him, though it could be retailed, allowing a profit to himself at the same price as the other.

2688. What did this person do?—He has not established the business at all in consequence of the difficulties he thought he should have to meet in establishing his business; I advised him to advertise his commodity, and to see the medical men, and endeavour to get a sale for it.

2689. *Chairman.*] He failed in doing that?—Yes.

2690. Mr. *Villiers.*] Do you believe he exaggerated the extent to which that article is adulterated?—No. Mustard is not only a condiment, but it is exceedingly valuable in medicine; we use it in cases of convulsions, and cases of apoplexy, and cases of severe disorder of the stomach, and I have often been greatly disappointed by the action of mustard poultices through the adulteration of the mustard.

2691. *Chairman.*] Are you aware that it has been given in evidence that there is a conventional standard of mustard, and that therefore no medical man is deceived with respect to the strength of a mustard poultice; do you agree with that opinion?—I do not.

2692. You believe that mustard does differ in its effects and strength very materially, and that therefore a medical man administering an emetic, or prescribing a poultice, would be very dubious as to the effect which either might have?—Unquestionably; these things occur daily to persons engaged in medical practice. I have advised the application of poultices to the calves of the legs in cases of apoplexy, and they have remained, applied for hours, without reddening the skin. In cases of convulsions in children the application of a mustard poultice is very useful. It is also a very good emetic, but the action of Cayenne pepper, which is generally present in mustard, is very different from the action of mustard itself. One has an action on the bowels as well as being a stimulant to the stomach. I have found in specimens I have tested that large quantities of flour and turmeric were present.

present. The strength of the mustard is reduced by the flour, and with that the strength of the natural yellow colour. That is restored by the turmeric, which gives to mustard a bright yellow colour. Now the mixture of the two seeds, the black and yellow mustard seed, has a dead yellow appearance; and therefore difficulty arises in persuading the public that the dead yellow mustard is the genuine article, and the other adulterated.

2693. Have you any doubt as to the fact of the adulteration, and that it is profitable to sell the article in the state you describe?—I have no doubt it is for the purpose of deception, to enable the manufacturer of mustard to add a certain substance of inferior value to the mustard, and so increase his profit.

2694. It is not for the purpose of meeting any general taste as to mustard?—I think not.

2695. Mr. *Gregson.*] Turmeric is not injurious, is it?—I do not know that it is; it is a re-agent for the detection of acids and alkalies.

2696. Does not it add strength as well as colour?—I do not think there is anything in it to be advantageous to the consumer; in Cayenne pepper I have detected red lead in three samples; the Chairman transmitted to me a letter giving an account of a case in which the consumption of Cayenne pepper had produced poison, and the individual is now suffering in London in consequence of the reception of lead into his system in that way: the medical men in attendance upon him at University College Hospital were not aware of the nature of his disease till the question was put to him, whether he had been engaged in any lead works, or had had introduced lead into his system in any way; he then mentioned that he was in the habit of consuming a large quantity of Cayenne pepper; the Cayenne pepper was tested, and found to contain red lead, and the symptoms he was suffering from were those of lead poisoning.

2697. This man so suffering, and you ascribing it to the Cayenne pepper, was that pepper examined, and found to contain lead?—Yes; it was so stated, and that the man's health was deteriorated in consequence of that Cayenne pepper, adulterated with red lead. There is a substance which I was requested by a gentleman in business at Birmingham to mention here, and that is emery. This is so mixed up with rust of iron, that he is unable to give the polish to his materials which he desires. Another article I would mention is cyanide of potassium, which is used by electro-platers in Birmingham. To such an extent is adulteration carried by the admixture of pearlash, that the electro-platers have considerable difficulty in plating their goods. I examined some samples of this cyanide of potassium, and found it to be extensively mixed up with pearlashes.

2698. *Chairman.*] Are you aware that Mr. Redwood stated that the adulterations carried on in those articles were so generally well understood in the trade, that they did not interfere with the process of manufacture?—I heard that statement.

2699. You do not agree with it?—I do not; at first, the electro-platers commenced to manufacture cyanide of potassium. They found that process to be exceedingly difficult, tedious, and troublesome. The druggists then commenced to manufacture it; after that it became so much adulterated, that before a workman would undertake some special plating, he stipulated that he must make this cyanide of potassium himself; and they tell me they are very much interfered with by the adulteration of cyanide of potassium. Pearlashes are added for the purpose of giving weight. I may state the price of pearlashes; they are about 4 *d.* a pound; cyanide of potassium is from 2 *s.* 6 *d.* to 4 *s.* a pound; and without chemical analysis it would be impossible to detect the amount of pearlashes and bicarbonate of potash; it is only ascertained by the amount of silver which is dissolved in a certain weight. With respect to coffee, it is very much adulterated indeed; I have found roasted corn and chicory in it; and some time ago, at a watering-place, I observed not only cocoa-nibs ground up, but a quantity of mustard added to the coffee.

2700. Mr. *Villiers.*] How long have you been inquiring into these matters?—I have observed the adulterations of drugs many years, but have paid special attention to the subject during the last year and three quarters. The subject attracted my attention by the state of bread in Birmingham, and by the effects of coffee on the system of a patient.

2701. Have you examined many samples of coffee?—Yes, the samples which have come into my own house, and which I have gone round to purchase in different parts of Birmingham. I have found the coffee to be very much adulterated with chicory. I lately sent out my servant to ascertain the effects of this ex-

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posure, and the probability of something being done. She went into one shop, and asked for pure coffee, and had a quantity of coffee given to her; a person ran after her, and said, "Will you come back? We have been fined 5*l.*, and we must put a label on this." Chicory was present in that parcel.

2702. Did she pay for pure coffee?—Yes.

2703. Mr. Alderman *Cubitt.*] Did you test it with the microscope?—No; the practical way of testing for chicory is by cold water; if it is pure coffee, the water is very little discoloured, and if it is adulterated with chicory, it soon forms a very black solution.

2704. Mr. *Villiers.*] That is not a certain test for chicory, is it?—The chicory itself might be adulterated, but that process is a test of the purity of the coffee.

2705. Mr. Alderman *Cubitt.*] Do you mean that pure coffee would not stain cold water?—To a very trifling degree; if the sample of coffee is adulterated with chicory, you have at once a black solution, more or less intense according to the amount of adulteration.

2706. Mr. *Villiers.*] There was no return of the money, was there, in the case you have mentioned?—No, nor did the seller mention that the sample contained chicory; pure coffee was inquired for; the seller had not got pure coffee, but he gave the purchaser what he had; then, on the servant going out, thinking of the previous fine, he ran after her, and placed the label upon it without further comments. I have found essential oils to be very much adulterated with common oils. And there is a very valuable medicine which we prescribe in obstinate constipation, namely, compound extract of colocynth; that is sold at different prices; you may purchase it at 28*s.* a pound, and, I believe, as low as 10*s.* I know that the effects of extract of colocynth are very different; in some cases it has a very powerful action, and in others a very mild action; I have prescribed a large quantity of extract of colocynth myself in severe cases without any effect whatever on the bowels; but on giving a dose of the better extract, it has had the desired effect at once.

2707. When you have prescribed it, and it was not pure, it has not had the effect; when you have secured the patient having a better extract, it has operated as you intended?—Yes; I have lately found quinine very much adulterated with salicine, that is, an alkaloid obtained from the willow bark; it may have some effect upon the system.

2708. Is it imported, or made from willow bark in this country?—I believe it is made in this country; a sample lately contained one-third. The price of salicine is 1*s.* 9*d.* an ounce; quinine, at present, I believe, is 9*s.* A simple test for it is a single drop of oil of vitriol; it produces a beautiful red colour.

2709. *Chairman.*] At what price was this mixture sold?—It would be sold at the same price as ordinary quinine, 9*s.* an ounce. This is an adulteration within the last fortnight or so. There is a substance named quinidine, which is made from an inferior bark. This is mixed up with quinine; it is easily detected by its insolubility in sulphuric æther and liquid ammonia. With respect to this part of the question, I have the statement of a case in which quinidine was supplied entirely for quinine. That was to a public institution. In the case of tamarinds, which contain several vegetable acids, I have found them acidified with sulphuric acid. Tamarinds, I may mention, are an exceedingly valuable medicine as a beverage in fevers and inflammatory diseases.

2710. Mr. *Villiers.*] Do they come from the West Indies?—From the East Indies and the West Indies, too, I think. Cod-liver oil I have found to be very much mixed up with other oils.

2711. Is it easy of detection?—No, it is difficult of detection. The way in which I test cod-liver oil is this: I have oil which I know to be made from the liver of codfish, and I take a certain quantity of the genuine cod-liver oil which I have seen manufactured myself, and add the same quantity of test to it, and then compare the colour of the two. During the late intense frost in Birmingham most of the genuine oils were in a solidified condition, whereas the other kinds of oils were fluid. It has been stated to me that the stearine has been removed from those oils, but I was not aware, nor do I believe that the profession are generally acquainted with that fact. In prescribing cod-liver oil we expect we are prescribing the constituents of the oils extracted from the livers themselves. It may be an advantage to remove the stearine, but I believe the medical profession are not generally aware that that is done.

2712. *Chairman.*] Do you believe the adulteration of cod-liver oil to be very general?—I do.

2713. Mr. Alderman *Cubitt.*] Do you mean that the stearine was removed from the genuine or the spurious oils?—From the genuine oil; and therefore the fluid part of the oil remained fluid at a low temperature. In the milk of sulphur I have found from 10 to 50 per cent. of sulphate of lime or plaster of Paris; this is extensively used in schools.

2714. Can you say that milk of sulphur is extensively adulterated with sulphate of lime?—Yes.

2715. Is that injurious?—I should say the repeated use of sulphate of lime would be injurious.

2716. *Chairman.*] Plaster of Paris must be injurious in itself, must not it; it is perfectly innutritious, and not digestible?—Certainly; it is like introducing into the system a quantity of clay. A medical man prescribes milk of sulphur as a purgative. Circumstances may arise in which he may mix it, but he ought to be the judge of those circumstances. I would not myself add to sulphur a substance like sulphate of lime. Scammony I have found to be extensively adulterated with chalk and starch; I have seven samples here, which have been furnished to me by a druggist, who is exceedingly desirous to have something done to protect him in purchasing. The following statement I have verified by examining them myself. The first sample contains 85 per cent. of resin.

2717. Is that a necessary element of scammony?—Yes; 85 per cent. were in the first sample; that is thought to be a good sample; another had 75; the third, 66; the fourth, 49; the fifth, 39; the sixth, 32; and the seventh, 7½ per cent. of resin, and the resin extracted from this sample I do not believe to be the resin of scammony at all. Those substances are mixed up with starch and chalk in various proportions, which have not been ascertained. With regard to the price, the cost of the resin which was extracted in the best sample would be 47*s.* a pound; the next, 34*s.* 8*d.*; the next, 28*s.* 10*d.*; the next, 30*s.* 8*d.*; the fifth, 56*s.* 4*d.*; the sixth, 40*s.* 8*d.*; and in the seventh the cost was to the trader 146*s.* a pound.

2718. Mr. *Villiers.*] Do you believe it to be general that the druggists are themselves imposed upon?—I do, and I can give an instance. A quantity of white precipitate used for forming ointments came down from town adulterated to the extent of 65 per cent. with chalk and magnesia; the druggist was not aware of the adulteration, and had requested the manufacturer to send him a genuine article, inasmuch as his shop is a shop at which physicians' prescriptions are made up. He was not aware that the article was adulterated till I pointed it out to him.

2719. He knew the price he paid for it?—He paid the price of a genuine article. The next sample he got from a different place was also adulterated.

2720. Does he get it from a wholesale house in town?—He does. I have found tartarized soda mixed with sulphate of potash; this is not an injurious admixture, inasmuch as sulphate of potash is itself a purgative. Oxide of antimony I have found to contain a quantity of chalk; spirits of nitre I have found very much diluted indeed with water, and frequently impure, containing a free acid, and thereby rendering it injurious to delicate persons, producing irritation of the stomach; the red precipitate used for ointment I have found mixed with red lead. I have here a sample of medicine prepared and sold in capsules; these are capsules containing, as it is said, concentrated castor oil, but really containing croton oil.

2721. Is there any castor oil in them at all?—I do not believe there is any castor oil at all.

2722. What is the difference in the effect of the two medicines?—Croton oil is a medicine of a very violent purgative character; castor oil, on the contrary, is the mildest kind of purgative. I know a gentleman who was confined to his bed two days in consequence of having taken two of these capsules; one of these capsules contains ten drops of oil, and is stated to be equal to a teaspoonful of castor oil. Now castor oil cannot be concentrated, and therefore this is a gross deception upon the public.

2723. What is the difference in price of the two substances?—Croton oil itself is a very active purgative indeed; half a drop of croton oil would be a very fair dose for an ordinary person. I believe the sale of these castor oil capsules has been interfered with in consequence of one manufacturer adding too much croton oil to the common oil; in fact, there was a quarrel between two manufacturers;

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I had that from a very good authority, a physician in Birmingham; one person introduced too much croton oil, and purged the people very violently.

2724. How long ago was this?—Within the last 18 months.

2725. Do people go on taking croton oil now?—They go on taking those capsules, expecting they are taking castor oil.

2726. Does no one enlighten the public at Birmingham on that fact, that there is no such thing as concentrated castor oil?—I endeavoured to enlighten the people in Wolverhampton. I produced those capsules, and showed them the utter impossibility of their being concentrated castor oil.

2727. Has that succeeded?—I am afraid not.

2728. *Chairman.*] The Honourable Member's question would imply that Birmingham alone was the victim of this trade; is that the case?—By no means. After I came up from Wolverhampton a druggist came to me, and said, "You ought not to say too much about these concentrated castor oil capsules; people know about them pretty well." A lady said, "You take me for a person of ordinary intelligence, but I was not aware that these capsules contained croton oil; I thought, in the progress of science, castor oil could be concentrated, and as it is a disagreeable medicine to take, I was exceedingly glad that it could be placed in capsules and swallowed without any taste."

2729. Mr. *Villiers.*] If they take this medicine in moderation does it do them any harm?—I should say not. I should not myself prescribe croton oil as an ordinary purgative; it is a violent medicine. Balsam of copaiba I have found to be extensively mixed up with fixed oils; this is an exceedingly nauseous medicine to take, and it has been prepared in capsules, similar to those which are now before the Committee. A gentleman in Birmingham, eminent for a certain line of practice, was prescribing these capsules containing balsam of copaiba as he thought; his patients got no better, and he found those capsules to contain linseed oil; there was not one particle of balsam of copaiba in them. I need scarcely say that during the whole of that time the disease was progressing, and in all probability would lead to certain results which would render the person miserable for life.

2730. Was there some person in Birmingham who sold those things, or had the doctor himself been imposed on?—Those were prescribed by an eminent surgeon, knowing that balsam of copaiba was made up in the form of capsules; expecting his patients to be taking copaiba, and finding them to get no better, his attention was directed to those capsules, and he found them to contain linseed oil.

2731. Did his patients all obtain those capsules from the same place?—I am not in a condition to answer that question.

2732. It does not follow that they should do so, unless he directed them to go there?—No.

2733. If they went to different places in the town it would show that it was a very general practice?—Certainly. I am not prepared to say that that occurred in more than one case. On the 6th of July this year, I tested in a respectable shop in Birmingham several essential oils, and these are the results: the oil of peppermint, both English and foreign, I found to be mixed with fixed oils; oil of cassia also, oil of cinnamon, oil of lavender, oil of anise-seed, oil of cloves, oil of juniper, fennel oil, rosemary, sassafras, dill, and pennyroyal.

2734. What do you mean by their being mixed with fixed oils?—This is an adulteration to increase the quantity of essential oil.

2735. What is the oil which is mixed up with the essential oil?—I did not ascertain that; it was a fixed oil; such a substance as train oil or fish oil; essential oils are volatile oils; when they are exposed to heat, they pass off entirely; fixed oils, on the contrary, remain.

2736. Mr. *Gregson.*] Are those fixed oils generally prejudical?—They would be prejudicial in this way: the strength of the volatile oil would be reduced.

2737. Mr. Alderman *Cubitt.*] The difference in value would, of course, be very great?—Very great indeed.

2738. You said you tested those oils in a shop; did you do so at the request of the dealer?—He is a person who is well-disposed towards this movement. I said, "Will you let me test your oils?" I did so, and to his surprise he found they were so mixed up.

2739. Mr. *Gregson.*] They were tested before you left the premises?—Yes; I took the oils myself out of the bottles. Tartaric acid I have found to contain 30 per cent. of alum; I have found one grain of oxide of lead in 10 of calomel;

tartar

tartar emetic I have found to contain free cream of tartar. I believe this to have been owing to an error in the preparation; but at the same time, of course, it is an impurity which ought not to be allowed to exist. If you prescribe tartar emetic for a sick individual, the effect is just the same; it matters little to him whether the adulterating substance has been added with an intention to defraud, or from mere carelessness.

2740. Mr. *Villiers.*] What would be the difference in effect?—A medical man, in looking to his patient, would take into consideration the state of disease, and apportion his dose accordingly.

2741. Cream of tartar would not assist the tartar emetic?—No, it would tend to lower the action of the medicine. I have found senna leaves mixed up with argell leaves; cream of tartar I have found to contain one half, or even three parts of alum in it; mercurial ointments I have found to be adulterated with blue clay; it is easily detected by applying heat to it; the entire fat is decomposed and passes off, and the mercury too, and then you have this solid, earthy substance left, which is the impurity.

2742. *Chairman.*] It materially affects the action of the ointment?—Undoubtedly. Iodide of potassium is a medicine which is extensively used, and is an exceedingly valuable remedy in various diseases; I have found this to have carbonate of potash in it. To prove how extensively these articles vary in price, I have here lists of drugs in which the Committee will see different prices for the same article.

2743. Mr. *Gregson.*] The prices vary according to the quality, do not they?—Yes, but a chemical preparation ought not to vary at all.

2744. *Chairman.*] Those chemical preparations ought to be in conformity with the Pharmacopœia?—Yes; I have with me the London College Pharmacopœia, and a Druggists' Pharmacopœia or Nostrum Book, and I can point out the discrepancy between the two; in one case certain articles are ordered to be mixed up, and in the other they are left out, or others substituted for them.

2745. I believe there is a standard quality in the Pharmacopœia for those articles, the prices of which you are about to mention?—Yes.

2746. That standard article can be purchased at a given price, but in spite of that the article itself can be bought in such an adulterated condition that the price is materially reduced from the price of that which is the standard?—Yes; I will take the instance of spirits of ammonia, called sal volatile; that may be purchased at 1*s.* 10*d.* a pound, and at 2*s.* 4*d.*; spirits of sweet nitre may be purchased at 2*s.* 3*d.* a pound, and at 2*s.* 6*d.*

2747. Mr. *Gregson.*] Taking the commodity at 1*s.* 10*d.*, that may be of a sufficiently good quality for many purposes, may not it?—It may be. A medical man, in prescribing, prescribes according to the Pharmacopœia. Here is an article imported into this country, Barbadoes aloes; this varies from 12*l.* 12*s.* a cwt. to 5*l.* 10*s.* a cwt.

2748. That is owing to the inferior quality of the latter description?—Yes. If you prescribed the inferior quality, it might be very dangerous to a sick individual. I have before me a book used by druggists in the preparation of tinctures and medicines to keep in bottles. The London College Pharmacopœia and this vary very much indeed, yet the same names are given to very different articles.

2749. *Chairman.*] Some of the druggists in this country are in the habit of keeping a Pharmacopœia of their own, and compounding their medicines in a very different way from that which is prescribed in the London Pharmacopœia?—Yes; there is one commodity which I wish to bring under the attention of the Committee particularly, because it has a bearing upon the adulteration of gin. Here is a private prescription for spirits of rosemary: "Oil of rosemary, half an ounce; spirits of wine, four pints; water, six pints; alum and carbonate of potash, of each two drachms." The alum and carbonate of potash are added for the purpose of clearing the spirits of rosemary. The London College states, "Take oil of rosemary two drachms, rectified spirits a gallon, water a pint." So that there is no occasion for the alum and the carbonate of potash; but the druggist adding six pints of water to four pints of spirits of wine, the solution becomes turbid, and to clarify it he uses the alum and the carbonate of potash,

2750. Mr. Alderman *Cubitt.*] But the cost of one would be about one-third of the cost of the other, probably?—Yes. In the one case you have four pints of rectified spirits and six pints of water; whereas in the other case you have two

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drachms of oil of rosemary, and a gallon of rectified spirits, with only one pint of water.

2751. *Chairman.*] Can you give a rough guess as to the probable difference in value?—The cost of the private prescription would be about two-thirds less than the other.

2752. The genuine article would cost three times as much as the spurious one?—Yes. I have the evidence of a physician attached to the General Hospital in Birmingham, who has met with great disappointments in prescribing for his patients. He says: "I sincerely and heartily hope that you will bring your movement relative to the adulteration question to a successful result, for I am quite sure that not only do the people suffer from adulteration in articles of food and drugs, but physicians have frequently to deplore the defect of action of their remedies in the treatment of diseases, from active remedies being rendered ineffectual by abominable adulterations. My experience in the treatment of acute diseases quite leads me to this opinion, and I believe that many valuable lives have been lost when adulterated drugs have been relied upon. Believe me, yours faithfully, *Bell Fletcher.* July 20th, 1855." I have also a communication which I received from a druggist in Birmingham, Mr. Banks. He is very desirous that there should be some protection.

2753. Mr. Banks is a druggist, and he is anxious that some protection should be extended to the trade in respect of the impositions which are first practised upon him, and which he unintentionally practises upon his customers?—Yes; he says, "Dear Sir,—I beg to congratulate you on the success in the House of Commons of our zealous and able Member, Mr. Scholefield, in obtaining power to nominate a Committee with the view of devising the best means to secure the public wholesome food, drink, and physic. After 35 years' active employment in the drug trade, and mature deliberation, I am fully persuaded the public have a powerful claim upon the Legislature to protect them from inferior and adulterated drugs, chemicals, and pharmaceutical preparations. I feel strongly that, to accomplish so laudable an object, the primary step should be the appointment of a fully qualified examiner at every seaport town, with power to condemn every article used in the compounding of medicine, either adulterated or below a fixed standard of quality. It is obvious, if only pure drugs could be imported by our merchants, it would simplify the detection of the vendors of impure articles; indeed, if allowed to supply the market with trash, under the names of scammony, and other gum resins, opium, copaiba, rhubarb, sarsaparilla, barks (falsely sold as cinchona bark), &c. &c. &c. &c., the difficulty of preventing the supply of articles not possessing the full medicinal properties of their respective kinds appears to me insurmountable. I feel sure you will have the assistance of all right-minded chemists and druggists, even on the low ground that it would tend to destroy a pernicious system of competition. Heartily wishing you success in your laudable undertaking, I am, yours respectfully, *Mones Banks.*—July 1855."

2754. Mr. *Villiers.*] You have referred to quinine; is that very frequently adulterated with Epsom salts?—I have never found it to be so.

Henry Letheby, Esq., M.D., called in; and Examined.

H. Letheby, Esq., M. D.

2755. *Chairman.*] YOUR attention has been directed a good deal, I believe, to the investigation of adulterations of different kinds?—It has.

2756. I believe you were employed in some of the analyses connected with the "Lancet" analytical commission?—Yes. For 19 years before that time I was engaged by the late Dr. Pereira in making investigations for his great work on *Materia Medica.* He is the great authority on all questions relating to *Materia Medica.*

2757. Will you favour the Committee with your general views as to the existence of adulterations?—In the first place, I may say that it is a very difficult thing to get any article of diet pure; but there are several impurities which may be looked on as accidental impurities. I do not think that in a general way we sufficiently distinguish between adulterations and impurities. I will give you one or two examples of what I call accidental impurities. Poisonous grain is usually met with in bread. The darnel gets into the farmer's wheat, and in the process of grinding is mixed with the flour quite accidentally. Then, again, the insects which are commonly found in brown sugar are quite accidental; they never come there as fraudulent impurities. And so, again, copper in jams and jellies is quite

an accidental impurity, occurring in consequence of the acid of the fruit having acted upon the copper vessels in which it has been cooked. These are a few examples of accidental impurities occurring in food. Perhaps I cannot better employ the time which is at my disposal than by giving the Committee a general view of the result of my experience upon this subject. I may divide fraudulent adulterations into three or four kinds. Many adulterations are effected for the purpose of increasing the weight or bulk of a body. For instance, inferior arrow-roots, which are worth not more than from $1\frac{1}{2}$ *d.* to 6 *d.* a pound, are often made to take the place of expensive arrowroots. Again, farinas are used to adulterate chocolate and spices. Then again, starch sugar, and sugar made from diseased potatoes, is often employed to adulterate the cane sugar, and also for manufacturing cocoa paste and chocolates.

2758. Would that sugar be injurious at all?—No; it has not the sweetening power of the other, and you must use a larger quantity; perhaps, to a certain extent, the mixture of gelatine and isinglass would come under this category; a mixture which is more for the purpose of increasing its bulk than anything else; water in milk, and gin and vinegar, is also an adulteration, for the purpose of increasing the bulk of the article.

2759. You have had some connexion with the investigation of isinglass on a previous occasion, have not you?—Yes.

2760. You have, perhaps, heard the evidence which has been given to-day on the subject of isinglass?—I have.

2761. Do you concur in the evidence of Mr. Wallington upon that subject?—Not altogether; I differ from him in this respect: it is true there is not any chemical distinction between isinglass and gelatine, but there is a great distinction in respect of the price, and in respect of the taste of the article, and also a great deal of difference in respect of the action upon the human body; for instance, the flavour of ordinary gelatine is more like that of glue than genuine isinglass; it is not unfrequently made of the most impure materials.

2762. Assuming this gelatine to be pure, do you think that it is an article which should be sold under the name of isinglass, or that it is so like it as only to differ from it by being purer than Russian isinglass?—That is not my view of it at all; good isinglass never disagrees with the stomach, but gelatine does; when isinglass has been boiled for a little time it absorbs oxygen from the air; it is well known that soups which have been warmed up two or three times become very injurious. Now gelatine is made from boiling the skins of animals, and an injurious effect will be produced upon it from the action and the heat of the atmosphere.

2763. That is not a kind of adulteration which you yourself think justifiable?—I do not think any adulteration justifiable.

2764. It is not a necessary impurity?—No.

2765. You would not think that a person was justified in selling this particular article, and calling it isinglass?—I do not think he would be justified in doing so.

2766. Mr. Alderman *Cubitt.*] Do you concur with the previous witness in thinking that gelatine is chemically the same as isinglass?—Chemically it is the same, physiologically it is not the same. If we were to put it into the hand of a chemist, and tell him to analyse it, he would not discover the difference between gelatine and isinglass; but if both were administered to a delicate stomach it would soon detect the difference.

2767. *Chairman.*] Have you ever examined the particular kind of isinglass which has been made the subject of observation to-day?—I have.

2768. Mr. Alderman *Cubitt.*] There is no scientific test to distinguish the one from the other?—When they are both pure there is not, but we can distinguish inferior gelatine from isinglass very readily. There is a second class of adulterations, namely, adulterations which are practised to give a false strength to an article; for instance, sulphuric acid is commonly put into vinegar; by law one part in 1,000 is permitted, but frequently I have found six parts in 1,000. The common vinegar sold about the streets, which we see poor people shaking upon oysters, is nothing but sulphuric acid coloured with burnt sugar. Cocculus indicus is commonly introduced into beer for the purpose of giving a false strength to it. In one case which came under my knowledge the publican was found using it for the purpose of adulterating his beer to be sold the next day; the police had access to his premises, and took possession of everything on the table; the materials were brought to me, and I found that the publican, upon shutting up, had set about the

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work of adulterating his beer for the morrow. Then again, roasted sugar or black jack is employed very often for the adulteration of coffee, to give a false strength to it, and also for the purpose of adulterating chicory. So catechu and other substances are frequently introduced into tea, to give a false strength to tea. Then we come to a third class of adulterations, which are practised for the purpose of improving the appearance of an article, and those are the most serious adulterations; for instance, the facings upon tea are sometimes very injurious. Then the salts of copper, which we find in pickles and in preserved fruits, are very injurious. Alum, again, and chalk, which are put into bread for the purpose of improving the appearance of it, are injurious. It frequently happens that flour which has been a long time upon the road becomes sour, and it is a very common thing for bakers to introduce chalk into it to correct the acidity. Of that I can mention one most striking instance. An emigrant vessel, about to start for Australia, had on board a quantity of biscuit. Fortunately, they gave some of it to the crew about a week before the vessel sailed; they found it disagreed with those who eat it; it produced extreme constipation. The biscuits were sent to me for examination, and I found no less than about 31½ grains of chalk in an ounce and a quarter of biscuit. It would assuredly have killed the whole of the crew if it had not been discovered before they got to sea. Another adulteration is the introduction of ferruginous earths into sauces, and Cayenne pepper, in snuff and other things of that kind, in which there is no reason whatever why such substances should be used. Ferruginous earths are in some instances contaminated with arsenic. Oxide of lead and chromate of lead and bichromate of potash, which are terrible poisons, are commonly met with in snuff; in fact, the medical practitioner finds many cases of poisoning by lead, which he traces from one cause to another, till he ultimately finds that it was taken into the system mixed with snuff. But, of all adulterations of that kind, the introduction of poisonous pigments into confectionery is the most common and the most serious. There is not an article of confectionery in this country which is not so coloured. I have before me a sample of such confectionery (*producing the same*), in which there is enough chromate of lead to do very serious mischief.

2769. Did you purchase that specimen of confectionery at a large and respectable shop?—At a very respectable shop. A case of poisoning from this cause occurred at the London Hospital about two years ago; about 20 people were poisoned by confectionery which was sold by a Jew in the neighbourhood of Petticoat-lane. He had bought up the refuse stock of a large City confectioner, and distributed it among the people in that neighbourhood, and 24 of them were poisoned by it.

2770. Were the cases fatal?—They were brought into the hospital, and emetics were administered to them. The contents of the stomach were sent to me to analyse, and I found in them lead and arsenic, and this was found, upon inquiry, to have been the cause. Every article of confectionery in this country is poisoned in this way. Continental confectionery never is so poisoned. There is no reason why people here should not use inert pigments, for our confectioners do not approach foreign confectioners in reference to the appearance of their confectionery, and yet foreign confectionery does not contain any poisonous matter whatever.

2771. *Chairman.*] Have you any doubt that it would be very easy to devise a remedy for the evil to which you are now alluding?—It would be very easy. The Government, in my opinion, ought to point out what are the pigments which may be used, and what are deleterious, and ought to be avoided. I have now mentioned, I think, the most important adulterations in the third class. A fourth kind of adulteration consists in the poisonous matters which are introduced for the purpose of improving the flavour of confectionery. A number of essential oils have lately been produced artificially by means of chemistry, and some of those contain terrible poisons. There is, for instance, the essential oil of bitter almonds; it is about four times as strong as the strongest prussic acid sold in the shops, and yet it is frequently to be met with in the kitchen, and is used by the cook without any regard to quantity.

2772. Mr. *Gregson.*] In what shape is it used?—As a ratafia flavour. Essence of pear and of pineapple contain poisonous materials, and they have done serious mischief lately. Those are the principal adulterations which I desire to refer to in respect to food.

2773. Mr. Alderman *Cubitt.*] Is there much potato sugar made?—I will not say

say now what quantity is made. A year or two ago, when there were diseased potatoes, there were tons made in a week at one establishment I visited. The disease in the potatoes did not touch the starch.

2774. Mr. *Gregson.*] Have you given particular attention to the adulteration of coffee with chicory?—Yes.

2775. Coffee and chicory do not contain the same properties, do they?—No, they are not related in regard to their dietetical properties. The principle contained in coffee may be considered as essential to life, inasmuch as all nations use it; it prevents the wear and tear of the body. Now there is nothing in chicory which can do that.

2776. Is there any difference between beet-root chicory and what is called real chicory?—Not chemically; microscopically you can discover the difference. With respect to drugs, I may say that the great cause of the adulterations which we find in drugs has reference to the mixing of inert matter with powdered drugs. In fact there it is that you will find the greatest adulteration practised. There is a custom adopted among druggists which they call the 4 per cent. system; that is, if a hundredweight of drugs are sent to be ground, 108 lbs. must be returned, quite irrespective of the loss in grinding and the water which is given off in the act of drying. Now, we know from experience in the case of opium, from 15 to 25 per cent. of water is given off; therefore, if 4 per cent. only is allowed, they must put something to make it up. There are very few drugs which lose so little as that in drying. In order to make up the bulk which is lost, the drug-grinder will introduce saw-dust; they call it "powder of post," which is commonly employed for the purpose of making up the quantity. Sometimes, however, there are things found in powdered drugs which I believe must be introduced in order to effect pulverization. For instance, we find sandy matter in opium, and starchy matter. Now, resinous drugs cannot be powdered unless something is introduced; they become agglutinated and stick together. The heat produced by the friction of the mill causes them to agglutinate, and they must put in something to grind them. I believe that generally accounts for the sandy matter we find in opium.

2777. Viscount *Goderich.*] You would not call that, within proper limits, an adulteration?—We should not. In making an examination of about 200 samples of powdered opium, which have been supplied to me partly through the "Lancet" Commission and partly in my experience as lecturer on chemistry at the London Hospital, I have found that the powdered opium of English commerce rarely contains more than 5 per cent. of the active principles, morphia and narcotina; whereas the crude opium contains from 12 to 14 per cent.

2778. *Chairman.*] That is not such an adulteration as you would speak of as an accidental adulteration?—No; they have mixed with the opium in grinding a quantity of inert matter, or they have used an inferior opium.

2779. In such a case, a physician who had prescribed opium to a patient would find that his medicine produced a very different effect from that which he intended?—Yes; and if he went on increasing the dose, and the prescription happened to be taken to another druggist who was more particular in the quality of his drugs, death might be the consequence. There are many adulterations which are practised abroad over which a druggist has not any control. We have heard of scammony being adulterated; but the adulteration practised upon scammony is practised by the Jew at Smyrna who makes it up for the English market. I believe, in bringing it down to the port, he is obliged to introduce a quantity of foreign matter to prevent it decomposing; chalk and starch are put in to absorb moisture, so that it shall not undergo decomposition. That is often spoken of as an adulteration; but, within a limit, I cannot regard that as an adulteration.

2780. You think there is a limit beyond which it ought not to be permitted?—Yes.

2781. Suppose an inspection of drugs took place at the sea-ports, you would say that scammony containing a given quantity of resinous matter should alone be introduced?—Yes. Then, again, in reference to the French alkaloids, they are nearly all of them adulterated; those of them which are manufactured in this country are extremely pure. I will take the case of a——; a sixth part of a grain of English a—— will kill, whereas I myself have taken three or four grains of a—— without experiencing any mischief; it being an active medicine employed by medical men on some occasions with a special object, it would naturally fail in accomplishing what they wish. Then, again, sulphate of quinine, which comes from France, is very much adulterated. I have had occasion to give evidence on

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the French sulphate of quinine, and it is often adulterated to the extent of between 50 or 60 per cent. with sulphate of quinidine. The sample I have here was sent to America, and stopped upon its introduction there by the examiner. I believe 6,000 oz. were ordered by an English chemist from a French manufacturer; it was stopped in America and sent back to this country; and upon an examination I found that it contained that quantity of adulteration.

2782. That would be admitted into this country without any drawback?—Yes. The sulphates of quinine which are manufactured in this country are always to be depended on; sulphate of quinidine is now made here to a large extent; it is a fraud upon the pocket perhaps; the adulteration of sulphate of quinine is practised before it comes into this country. Then again musk is an article which is very much adulterated; false bags of musk are made to imitate genuine musk. It is nothing but a little piece of skin of the animal cut out; a bag made and filled up with dried blood.

2783. Mr. *Villiers.*] Is that with the object of profit?—Quite so; musk is worth about 63 *s.* an ounce, and this is worth not so many farthings; the counterfeit musk bags have the appearance of the genuine musk bag; it is only a practised eye that will discover the difference, and it has the powerful odour of musk, and till a chemical examination is made, you do not discover the fact of there being so little musk there.

2784. Is musk used medicinally?—Yes, it is used as a powerful stimulant in certain nervous affections.

2785. Does this imperfect article answer any purpose?—No; it is wholly without effect.

2786. Mr. *Gregson.*] Can it do any harm?—No.

2787. Mr. Alderman *Cubitt.*] Except disappoint the physician?—Except disappoint the physician. There are some other adulterations which are practised by the wholesale manufacturer without his being aware of the importance of the matter; he sends an article into commerce which is not what it ought to be. Take the example of milk of sulphur; that is now generally charged with half its weight of plaster of Paris, but it is made according to a formula which originated with the College of Physicians, and which they go on using at the present time. To make milk of sulphur it is first boiled with lime; muriatic acid should then be added to it, which gives a pure precipitate; but if you add sulphuric acid it will combine with the lime, and the plaster of Paris will go down with the sulphur; that is not the property at all of the genuine precipitated sulphur; precipitated sulphur is sold as a laxative, but this is a powerful costive-producing agent. I do not think chemists are quite aware of the manner in which milk of sulphur is produced. Another preparation we find in the druggist's shop is calamine; it should be carbonate of zinc; it is sulphate of baryta. I question whether a medical man would be able to recognise the operation of a pure calamine ointment; he has got into the way of using this thing, and it accomplishes what he wishes. Instead of carbonate of zinc being used where calamine is prescribed, he now uses sulphate of baryta.

2788. *Chairman.*] Is not that an exceptional case?—It has been used so long a time that if the pure calamine ointment were to be employed without the medical man knowing that it was to be so, he would find a very different action to what he intended.

2789. Do you know anything of sulphate of baryta being extensively used to adulterate white lead?—Very extensively indeed.

2790. It is brought to London in great quantities, and sold as white lead?—Yes; I think it only right to say that there are many drugs which a few years ago were very much adulterated, which we do not now find to be so; I think it is possible some of the evidence you might have heard on the subject of adulterated drugs may have reference to the drugs of six or seven years ago.

2791. What has produced the difference?—The Pharmaceutical Society having taught chemists how they should recognise the genuine articles from the adulterated ones, and having pointed out the necessity of using the genuine articles; the better education of chemists has produced the difference.

2792. Does it enable them to detect only imposition upon themselves?—I think it has a moral influence upon them also; I think they become banded together, and take a moral view of the question.

2793. Mr. *Villiers.*] Do not you suppose there is a difference in the price; when an article comes to a druggist inferior or adulterated, does not he know himself,

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or has he not some idea that it is a thing which is defective in some of its properties?—There are many important drugs which differ very materially in price; the difference in price may depend upon the colour. I have examined castor-oil for the Lancet Commission; I examined 30 samples of castor-oil, not one of which was adulterated. Cod-liver oil is very rarely adulterated; it is a rare thing to find cod-liver oil adulterated.

2794. On what ground do you make that statement?—I speak from what I have myself seen; I have examined scores of samples obtained from various towns, and I found no adulteration practised.

2795. You have found it pure?—Yes.

2796. Not mixed with other oils?—No, not mixed with other oils.

2797. Mr. Alderman *Cubitt.*] Did you hear the evidence which was given just now with reference to cod-liver oil?—No.

2798. It was said that it was frequently mixed with other oils; and a gentleman, who gave that evidence, said it was very difficult to test it by means of sulphuric acid?—We determine the quality of cod-liver oil in several ways, and not only the action of sulphuric acid upon the cod-liver oil, whereby you produce the violet tint. We find the proportion of bile principle and of iodine; and if we do not find any great difference, those are the medical principles in cod-liver oil; the oil itself does nothing; it is simply the bile principle and the iodine which are the active qualities.

2799. Mr. *Villiers.*] Is there anything more generally recognised than that cod-liver oil is not, generally speaking, pure? It is recognised by the advertisements of chemists and druggists, each vieing with the other in strong expressions, for the purpose of assuring their customers that theirs is the only pure oil?—No doubt of it.

2800. It is recognised at Paris and in all the capitals of Europe that this is an article which is adulterated to a greater extent than almost anything else?—The oil obtained from the liver of another fish may be employed, but we cannot discover that, and I do not call that an adulteration. The liver of every fish contains an oil which is charged with iodine and with bilary matter; it is very likely indeed that they all have the same therapeutic action.

2801. Might not the fish be in a particular state, or might not the liver be in a particular state, when the oil is made, so as to cause a difference in that way?—If the liver be made hot in order to extract the oil, as De Jhongh does, the oil is of a dark colour, and very likely to disagree with the stomach; but English oil is extracted from the liver when cold; there is a difference in the colour, produced by the difference of temperature at which the oil is extracted.

2802. Why is it that cod-liver oil is now manufactured a good deal in Newfoundland?—In order that the liver shall not undergo putrefaction, but that the oil shall be extracted there, instead of the liver being salted and the oil extracted in this country.

2803. Is not that a reason why the liver might be in a different state?—The oil would be in the same therapeutic state, only the liver being putrid, the oil may be offensive to the taste. If the liver is submitted to heat at the time the oil is expressed from it, it is very likely that the action of heat may injure the oil, or if the liver be allowed to putrefy, the oil is likely to disagree with the patient; but the oil of English commerce is very bland, very free from odour, and very free from colour also, and almost tasteless; it is a very unobjectionable oil in every way.

2804. Is there any motive to adulterate cod-liver oil?—I think not

2805. If the livers of other fish were taken, would not that save the expense of bringing that which is extracted from the cod fish from a distance?—I do not think you can get the livers of other fish to yield a sufficient quantity of oil for the purpose. The liver of the skate yields a similar oil, the action being very much the same as cod-liver oil, but it could not be used for it, because of the strong fishy odour. Cod-liver oil is free from odour, whereas skate-liver oil, and some of the other fish oils, have a very unpleasant fishy odour; but we have no chemical means of distinguishing the one from the other.

2806. Are there no means of detecting whether the oil is pure or not?—Only by ascertaining the proportion of the bile principle and the iodine contained in it.

2807. Is there something in it in common with all other oils in that respect?—Other oils do not contain the bile principle, nor do they contain iodine; but the

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livers of all fish yield an oil containing iodine and the bile principle, and it is exceedingly probable they would all have the same effect upon the human frame.

2808. There is a general opinion, is not there, that De Jhongh's and other cod-liver oil produce different effects?—There is this difference, that De Jhongh's oil may be taken for a longer time without the patient getting disgusted with it; frequently that is an impediment to the administration of oil, inasmuch as after going on for a fortnight or three weeks, the patient gets disgusted with the remedy. De Jhongh's oil will stay for a longer time upon the stomach than any other; it may be because of the care used in the preparation of it; he may get rid of certain acrid principles which we cannot recognise, but which are apt to disagree with the stomach.

2809. *Chairman.*] Has sarsaparilla come under your notice?—Yes.

2810. What is your view as to that?—Sarsaparilla cannot be adulterated. The extract of sarsaparilla may be made of sarsaparilla which contains an enormous quantity of starch, and such descriptions of sarsaparilla would not have the active principle which good sarsaparilla should possess.

2811. Have you examined many specimens?—Yes; there are two kinds: the Honduras sarsaparilla contains a small quantity of extract, and a very large quantity of starch; the Jamaica contains a great deal of extract and very little starch. In boiling down, the starch will yield the bulk of what people commonly call extract. The extract I refer to is the active principle, which differs from starch; Honduras sarsaparilla will yield the largest quantity of that; therefore it is that the one which is employed to make the extract is the one which possesses the least active principle.

2812. It has been given in evidence that some of the extract contained no sarsaparilla at all, but contained liquorice only?—All extract of sarsaparilla does contain liquorice.

2813. There has been no sarsaparilla in it?—I know of no positive test for determining the quantity of sarsaparilla in anything.

2814. Mr. *Villiers.*] When you spoke of gelatine, did you distinguish between refined gelatine and glue gelatine?—They are all the same, except that one is made a little more carefully than the other, or has not been exposed to so high a temperature; but glue gelatine is sometimes used, when clarified, for the very purpose of adulterating isinglass. In making gelatine, if they have an object in view, they will be careful in the application of heat; in making glue they are not careful; but having made glue, if there were a demand for it, they could convert it into gelatine, and bleach it. Most of the gelatine which comes from France comes from a large horse slaughterer's in the neighbourhood of Montmartre. Not many years ago there was put into my hands by the Excise something they knew nothing about. It came in at an *ad valorem* duty, and they asked me what it was. I found it was the hamstring of the horse, and it was traced to a large gelatine maker. I dare say the same thing in Holland would be employed in the manufacture of glue, only there they would not be so particular in the solution of it, and they would not care about its being coloured. Here they dissolved it a little more carefully, and made gelatine of it.

2815. Mr. Alderman *Cubitt.*] After they had gone through the process carefully would there be anything left but the pure elementary substance?—There is a substance left which ought not to be found in gelatine; that is, it is gelatine which has been acted on by heat, and is found to disagree with the stomach. Jellies are often prescribed by medical men during the convalescence of a patient when the stomach is very irritable; and if those jellies are made of gelatine which has been exposed to a high temperature they will generally disagree with him, whereas jelly made from Russian isinglass would not do so.

2816. If that be the case, the element is not precisely the same in the two cases?—No; it has undergone a molecular change. In fact, there is only a molecular difference between isinglass and gelatine.

2817. *Chairman.*] The fact of there being that molecular change leads to a different effect in the administration of that gelatine upon the system?—Yes.

2818. Mr. Alderman *Cubitt.*] Do you mean that there is a molecular difference between the one and the other?—Yes.

2819. With a high microscopic power could not you detect that?—We cannot see the molecules of matter. We should be very glad to do so. It would settle many abstruse points of physics if we could do it.

2820. Mr. *Villiers.*] You have a general opinion that adulteration is practised extensively both in drugs and articles of food?—Yes, I have.

2821. Can you make any suggestion as to the best mode of preventing it?—In respect of articles of food I had rather not offer a suggestion; the question is one which I feel I cannot cope with; but with respect to drugs, I think it would be possible to do away with the adulterations now practised. I think the matter might to a great extent be left to the Pharmaceutical Society, who have done a great deal of good within the last few years. Another means would be insisting upon the College of Physicians in the three countries agreeing in regard to the quality of the chemicals; for a prescription written here and taken to Scotland may kill a patient, so great is the difference in the character of the drugs.

2822. That would not prevent any frauds; if there are any frauds practised in selling articles, and making the customer pay for the pure article, that would not prevent it?—I do not think we have any very great number of adulterations practised upon the drugs supplied to the people.

2823. Did you hear the evidence, that there is a variation in carbonate of soda of 100 per cent.?—I did not. I have examined some scores of specimens of carbonate of soda, and I found in druggists' carbonate of soda rarely anything more than two or three per cent. of sulphate of soda, which is an impurity not worth considering, and it would cost a great deal to get rid of it.

2824. Mr. *Gregson.*] You have alluded to the great good done by the Pharmaceutical Society; does it consist chiefly of druggists or of medical men?—Of druggists entirely.

2825. Has the society any power of visiting druggists' shops?—No, but the College of Physicians have; and I think if they were more frequently to exercise it, it would do good.

2826. Do you know why the College of Physicians does not exercise it?—Apathy, I believe, is the reason. They have the power of committing a person to Newgate for selling a thing which does not come up to their standard of what the drug should be, but the power is never exercised.

2827. Do you think druggists have any objection to the use of that power?—No, I never heard of any.

2828. Mr. *Villiers.*] Would it require much time to qualify a man to be an inspector of either drugs or other articles which are said to be adulterated?—It would require a special education for the purpose.

2829. In a great many things, I suppose, the tests would be very simple?—Microscopical tests are very easy, and very little education would enable a man to discover the greater number of the frauds which are practised. He might discover almost all things except those which are injurious to health. Those chemical compounds which we find in confectionery require great chemical knowledge and experience and tact to discover.

2830. Supposing we had a system of inspection, do you think that one class of inspectors need not be so highly educated as another?—Yes.

2831. There might be one set for ordinary purposes, and another set to refer to in case of doubt?—Yes; but that is a matter which I have a good many difficulties in giving any opinion upon. The scheme which I would suggest would include the appointment of public inspectors; but I see this difficulty; you would require such a number of them, that I hardly know how you could meet the expense.

2832. It has been stated that if there were a few in actual existence, it would have a great effect upon the trade?—It might; but still you must put the execution of the law into practice, and it would entail a great deal of labour.

2833. Suppose those public officers only had to examine the things that were referred to them, would that be the case?—Yes. I think you must have a large staff of officers; in my own experience I know what happens: I am engaged in the examination of drugs and articles of food, and when an important question arises, as to the adulteration of coffee, for instance, I have more things sent to my laboratory than I can get through in a month, or two or three months. Under those circumstances I have more thrown upon my hands than it is possible to do; what it would be if there were a public inspector, I do not know.

2834. Is there any fee paid to you?—Yes, never less than a guinea; generally five guineas.

2835. Who makes the reference to you?—Generally people in the trade.

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2836. Not customers?—Sometimes people who fancy that things have disagreed with them.

2837. Are drugs submitted to you from the hospital?—Yes, the Drug Committee of our hospital refer things to me. When a drug is found not to produce the effect they expect the drug is submitted to me for examination.

2838. With your experience, that analysis does not require much time. You know the article, and you know the tests; do not you apply them immediately?—It requires a great deal of time. Take the case of confectionery; we must get rid of all the sugar which is in that confectionery; we must keep the coloured pigment for some days to separate the one from the other, and then it must be submitted to the process of testing.

2839. I suppose there is something very common and ordinary in all these adulterations; one is very much like the other?—We know generally what pigments are used, and we should look for those which we should suspect to be there from the appearance. That inquiry is assisted to a considerable extent by a true knowledge of these things. Still we are obliged, in cases where a charge may be made against an individual for selling a thing which has produced an injurious effect, to go through the inquiry most carefully. We must not suspect, but prove that the thing is there.

2840. Have you considered the plan they have adopted in the United States of a scientific man being appointed as a public officer to examine medicines imported from Europe?—Yes; that has been found to act very beneficially.

2841. Do you know whether that requires a very large staff?—No, I believe there is only one examiner, with assistants, at each of the large import towns.

2842. Perhaps the knowledge that the medicines to be sent out are to be examined by a public officer has an effect upon the medicines which are sent out?—It has.

2843. Do you know if they have any examination in the towns generally?—No, they make an examination of the drugs as they come into the country.

2844. *Chairman.*] Do they examine other things than drugs?—No.

2845. Do you know anything of the French law?—Only in respect of confectionery; they will not permit any but a certain class of pigments to be used; they will not even permit coloured paper to be used for wrapping up confectionery, unless it is stained with a certain class of pigments. A druggist is not permitted to keep poisonous drugs, except in a cupboard, the key of which is kept by the mayor of the commune.

2846. Do you think that drugs such as we import are extensively adulterated abroad?—A few of them are; but not so much, frequently, for the purpose of any fraudulent adulteration as to keep them. Many drugs will become injured upon the passage, and they are obliged to do something to them before they send them away.

2847. Do you think it would be worth while to have an examiner at the seaports here?—I think there is that degree of feeling among the druggists of this country, that they are not at all disposed to buy a very bad article. I know in the case of opium, that Indian opium, which is so bad that it does not contain above five per cent. of the active principle, comes to this country, and there is no druggist who will buy it. So it is with respect to most drugs in the bulk. Druggists in this country do not like to purchase a bad article; the drugs are sold by auction, and they do not like to have their names put down as the purchasers of those bad things.

2848. Do you know if we export medicines much from this country?—Yes; largely to America.

2849. Are you aware that the Crown direct all the medicines sent out to any Crown colony to be sent from Apothecaries' Hall?—I believe Messrs. Savory send one-fourth, and the rest go from Apothecaries' Hall.

Maurice Scanlan, Esq., called in, and Examined.

M. Scanlan, Esq.

2850. *Chairman.*] YOU are, I believe, a Licentiate Apothecary of the Dublin Apothecaries' Hall?—I am.

2851. You matriculated at the Dublin University as a medical student, but you have since then pursued a different branch of the profession?—I gave up the study of medicine for chemistry, and have continued it ever since.

2852. You

2852. You have been a manufacturer of chemicals, have not you?—I have been engaged in manufacturing them extensively, both for use in medicine and the arts.

2853. Where?—In Dublin, in Wolverhampton, and since, in London.

2854. You have been resident in London for some years as a consulting and analytical chemist?—Yes; I have the management of a chemical factory belonging to an extensive drug-house in London for making chemicals for use in medicines and in the arts,

2855. Will you state to the Committee, in general terms, the result of your experience with regard to adulterations, whether in articles of food or in drugs?—With regard to food, I have had very little to do, except that some years ago, when residing in Wolverhampton, I found alum both in bread and flour.

2856. In large quantities?—Yes; I read a paper before the Literary and Philosophical Society in Wolverhampton; I obtained samples of bread and flour from various places; I had the management of the ——— works at Whitby for some time, and we sent away from there a large quantity of ground alum, and it was an understood thing by the agents that that ground alum was used by bakers.

2857. Mr. *Villiers.*] The great demand for the alum was by the bakers?—For the ground alum; a great deal was sent away in a crystallised state, and a great deal in casks as ground alum.

2858. *Chairman.*] Do you draw a distinction between what was sent to bakers and to millers?—No; I know in Wolverhampton there was a good deal said about the adulteration of bread with alum, and we found that the bakers were afraid to use it, and we had every reason to suppose that alum was mixed with the flour by the millers; I purchased upon that occasion small parcels of flour at small dealers', put up in bags for the poorer classes, and I found alum in the flour.

2859. Mr. *Villiers.*] What did they substitute for alum when they were afraid to use it in bread?—They got flour with alum mixed with it. The bakers were afraid of having alum found on their premises.

2860. *Chairman.*] You have been, among other things, a licensed rectifier, have not you?—Yes, in Dublin, for 15 years.

2861. That has given you some acquaintance with the spirit trade?—Yes.

2862. Can you give us any information as to adulterations in spirits or beer?—I became a licensed rectifier for the purpose of making spirits of wine; I was never a maker of gin or of cordials, or anything of that kind; but I have heard the evidence given here, and I do not see any reason why a retailer should mix water or anything else with his gin; I do not see why it should not go into consumption directly as it comes from the rectifier.

2863. Mr. Alderman *Cubitt.*] Gin and brandy are made first by the person who makes the raw spirit?—A pure, flavourless raw spirit is made by the distiller; upon that the duty is paid; upon that it goes to the rectifier; he distils it with other ingredients to make gin, with juniper berries, for example.

2864. Does he lower the strength in rectifying it?—He does. I believe formerly the raw distiller was not allowed to send out raw spirit of any strength above 25 per cent. above proof; recently they have been allowed to send it out at 50 per cent. above proof to the rectifier.

2865. *Chairman.*] Is there any limit to the reduction as practised by the rectifier?—I believe not, except the custom of the trade. It was stated by several witnesses that the retailer reduces his gin, and then is obliged to add finings to brighten it; that does deteriorate the gin, inasmuch as it throws out of solution the essential oils, which are added to give a peculiar flavour to constitute gin; water has that effect upon it. The essential oils are soluble in alcohol, but if they dilute the alcohol too far, the oils are thrown out of solution, and this process of filtration is resorted to to make it bright again, and to look well to the eye.

2866. Mr. *Villiers.*] You say that it deteriorates gin; does it make it injurious to health?—No.

2867. *Chairman.* It destroys some of the essential properties of the gin?—Yes, and takes some of the essential oil out of it which the rectifier added to it to flavour it. Dram-drinkers here appear to have got into the habit of drinking gin of a certain strength. I believe in Scotland and Ireland the dram-drinkers drink whiskey of a greater strength.

2868. You believe that they put in something to make the gin stronger again after they have reduced it by water?—I do not know that of my own knowledge.

M. Scanlan, Esq.

8 August 1855.

2869. Are there any other articles you wish to call the attention of the Committee to?—There is no other article of food or drink. There is a substance I have known to be sold as soluble Cayenne, which contains both copper and vermillion; the copper is accidentally introduced into it from the mode of preparation. It is taken from a copper still. They make a sort of tincture of the Cayenne pepper, and they filter it and pour it upon a quantity of salt in a copper still; it then takes up a little copper, and then this salt is dried and mixed with vermillion and rose-pink.

2870. Vermillion is a poison, is not it?—I believe it would be. The amount is very small; they put about six drachms of vermillion to about three pounds of salt. I think a broad distinction should be made between accidental impurities and adulterations. Accidental, or more properly incidental, impurities find their way into preparations in two ways; both from the impurity of the material employed and sometimes from the nature of the vessels. In most substances you may get some iron or copper, and in some substances you may get arsenic. You get arsenic in oil of vitriol to a great extent. That arises from the employment of pyrites instead of sulphur. Oil of vitriol is made in large quantities by alkali makers, and when the price of sulphur is high they use pyrites instead, and pyrites almost invariably contains arsenic. Irish pyrites contains a good deal, but I have understood that the Cornish pyrites contains still more. Some few years ago I found an enormous quantity of arsenic in sulphuric acid here in London. It finds its way into muriatic acid made from that sulphuric acid, or in the manufacture of which that sulphuric acid is employed, and hence it may be very mischievous. A mixture of muriatic acid and soda has been used in bread, and I have seen muriatic acid containing a very fearful quantity of arsenic.

2871. Mr. *Villiers.*] What is the object of using muriatic acid in bread?—It is to make what is termed an unfermented bread. Muriatic acid takes the carbonic acid from soda, and acts instead of yeast.

2872. Have you made many experiments upon bread?—No, very few. I have found also impurities in chemicals used in medicine, arising from the ignorance of the chemist who prepared them. There are some chemists who undertake to manufacture chemicals used in medicines who are ignorant of the ordinary principles of chemistry, and hence I have found the articles which they have sent out very impure. I think a broad distinction ought to be made between those impurities and purposed adulterations. I have met with a great many articles which have been spoken of here adulterated purposely. I discovered by accident an adulteration of powdered jalap to a great extent. I went into a druggist's warehouse one day in Wolverhampton, and saw a number of powders ready folded in 7 lb. or 14 lb. parcels. There was one I did not know. I asked the warehouseman what that one was. He told me it was powdered jalap. I said it was not powdered jalap. He insisted that it was. I said, "It is not the colour of jalap." I took a corner of the paper and moved the powder, and I saw that the mass of powder had a different colour from the surface. I said to him, "That is a very curious thing." It looked very like the effect which rays of light produce upon guaiacum. The man began to laugh, and told me it was jalap-root and guaiacum shavings sent in equal weights to the mill to be ground, and sold as jalap powder. I spoke to the druggist myself afterwards, and told him if he must mix anything with the jalap he had better mix something else.

2873. Mr. *Gregson.*] Are guaiacum shavings injurious?—No.

2874. *Chairman.*] The general effect of your evidence is, that there is a considerable amount of adulteration in drugs?—In drugs and chemicals used in medicine.

2875. And therefore considerable risk exists that the prescriptions of physicians will not have their intended effect upon their patients?—There is no doubt of it. I heard Mr. Redwood's evidence, and I do not think he admitted adulterations to the extent to which they really exist. I have no doubt the Pharmaceutical Society have done a great deal of good in the education of chemists and druggists, but I believe that that education is not compulsory here, as it is in Ireland.

2876. The examination is compulsory in the case of every member of the Pharmaceutical Society, is not it?—I believe not. The adulteration of soda has been spoken of a good deal. I believe the article of bicarbonate of soda is very seldom adulterated; at least, it has never come under my knowledge; but there is an article called soda, which is used in washing, and that I know has been adulterated to a great extent. I knew a man living at Whitechapel, whose trade

trade was to buy crystals of soda and adulterate them with Glauber salts. I believe it found its way into the oil shops, and was bought up by the poorer classes for washing.

2877. Even for washing purposes, would the Glauber salts be useful?—Not at all; it is like adding water to gin. Large consumers of soda, such as makers of soap and so on, buy it almost directly from the manufacturer, and they buy it by certificate and according to its real value; they buy their white ash exactly as a rectifier buys his spirit, according to its strength. I may mention, that I have had a knowledge of most of the drug-houses in London for 30 years and upwards, and I do not believe that any of the large houses lend themselves to any adulteration whatever; and the same thing may be said of a great many of the retailers. There are hundreds of houses in London one may take things from blindfold.

2878. Do you know anything about the four per cent. system we have heard so much of?—I have only heard of it.

2879. Assuming that principle to be in existence among drug-grinders, do not you think it must tend to adulteration to a certain extent?—Undoubtedly. I do not believe the statement made by some of the drug-grinders, that there are some things which it is necessary to add foreign matter to in order that they may be powdered. I heard Dr. Letheby say that it was necessary to add something to opium. Now that is not the fact, for I can remember, as an apprentice, having dried and powdered and sifted a large amount of opium through a fine sieve without the addition of any extraneous matter whatever. There is a species of adulteration, which was found out accidentally not long ago by Dr. Taylor, and I made some experiments upon it; it is nux vomica. This adulteration was traced to the drug-miller, and his excuse was, that the substance was so tough that it was impossible to powder it alone; but it was necessary to add guaiacum to it; that is not the fact, for I have dried some nux vomica, and I had it powdered in a mortar and sifted through a sieve without any difficulty.

2880. Mr. *Gregson.*] Can you suggest any plan for suppressing adulteration?—Some mode of inspection would do a great deal of good. The principal check to it, I think, would be improved education on the part of chemists and druggists, and on the part of those who buy the articles which are said to be adulterated.

SECOND

REPORT

FROM THE

SELECT COMMITTEE

ON

ADULTERATION OF FOOD, &c.;

TOGETHER WITH THE

PROCEEDINGS OF THE COMMITTEE

AND

MINUTES OF EVIDENCE.

Ordered, by The House of Commons, *to be Printed,*
8 *August* 1855.

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I N D E X

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The examination by witness of London stout and porter showed that the samples obtained at the brewers' taps were much stronger than those procured from publicans, *Hassall* 93——Witness is not aware of any adulteration by the brewer, *Normandy* 699. 727–729——Doubt as to the brewers practising adulterations, *Mitchell* 1095–1097.

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Practice in regard to the visits of excise officers to breweries with a view to the detection of frauds on the revenue, *Phillips* 2317–2324——There have only been about four prosecutions by the Excise for the adulteration of beer, *ib.* 2486, 2487——The samples of beer which were examined came chiefly from breweries, *ib.* 2500, 2501.

5. *Mode*

Reports, 1855—*continued.*

Beer—continued.

5. *Mode of determining Adulteration:*

Means of ascertaining the quantity of water in beer, *Normandy* 709–711. 714, 715. 718, 719——Necessity of fixing on a certain gravity for beer before its adulteration be considered, *Phillips* 2446, 2447——Fallacious analysis of beer by Dr. Hassall if he employed acetate of lead for the purpose, *ib.* 2483.

6. *Gain to the Revenue if genuine Beer were sold:*

Considerable gain to the revenue if beer were consumed in a pure state, *Normandy* 720——Loss to the revenue of about 1,000,000 *l.* a year by the adulteration of beer, *Simmonds* 2050.

See also *Ale. Cocculus Indicus. Nux Vomica.*

Bicarbonate of Soda. See *Carbonate of Soda.*

Blackwell, Thomas. (Analysis of his Evidence.)—Member of the long-established firm of Crosse & Blackwell, 1560–1562——Practice in the trade for the last thirty-five years, in making pickles, to use copper vessels in boiling the vinegar, there being several processes of boiling so as to give a good colour to the pickles, 1563–1566. 1603——Abandonment as far as possible by witness's firm, in consequence of the articles in the "Lancet," of the practice of colouring their pickles and preserves with copper, 1567, 1568. 1591——By some of the respectable firms pickles are made less green than formerly, 1569.

The result to witness's firm in changing the green colour of their pickles and fruit has, on the whole, been rather advantageous, 1570–1573——Defence of having coloured with copper on the ground that it was not considered to be actually unwholesome, and was never complained of, 1574, 1575. 1593. 1599–1602——Use till lately of bole Armenian by witness's firm in colouring anchovy sauce; harmlessness of the same, 1576–1579. 1582, 1583——Extent to which their recent abandonment of the use of bole Armenian has been objected to, 1580–1587——The anchovy sauce not artificially coloured has an improved flavour, 1584–1590.

Belief that red lead is not used in the trade for colouring, 1588, 1589——Respectable houses do not adulterate anchovies with inferior or damaged fish, 1594–1598——Approval of the prohibition of adulteration in pickles and sauces, &c.; the public would soon prefer the genuine articles, 1609–1615——In trade generally the most respectable houses are least suspected of adulteration, 1616, 1617.

Blue Pill. Spurious article exported to America, *Simmonds* 2061, *and p.* 43.

Board of Health. Statement with respect to the Board of Health not having moved in the present matter; views of Sir B. Hall on the subject, *Hassall* 191–194. 221——The Board of Health, advised by proper medical authorities, would be the most suitable body to decide what are the adulterations to be proceeded against, *Simon* 803. 806–808. 829–833. 843–845—— A central body of medical authorities might act in connexion with the Board of Health, *Thomson* 1559.——*See* also *Local Boards of Health.*

Board of Inland Revenue. Limited sphere of operation of the Excise in regard to adulterations, *Hassall* 182. 200——Failure of the Excise to accomplish the suppression of adulteration in duty-paying articles; causes of such failure, *ib.* 182. 187–189——Objection to the Board of Inland Revenue as a central Board, *Simon* 807, 808.

Witness is chief officer of the chemical department of the Board of Inland Revenue, *Phillips* 2142, 2143——Enumeration of articles which it is the duty of witness to analyse in order to determine whether they are or are not adulterated, *ib.* 2144–2148——Summary of samples of different articles analysed by witness's department during the last 11 ½ years, showing the proportion in each case which was adulterated, *ib.* 2149, 2160–2162——Where adulterations are detected informations are invariably laid, and almost always lead to convictions, *ib.* 2170, 2171. 2173.

Particulars relative to the staff of chemical officers attached to the Board of Inland Revenue, *Phillips* 2175–2180—— Qualifications of the officers who determine the question of adulteration; how selected and remunerated, *ib.* 2395–2397. 2433–2444. 2456–2458——Facilities of the Board for the detection of adulterations, *ib.* 2433–2445. 2449–2459——Diminished amount of adulteration generally through the operations of the Excise inspectors, 4,000 in number, *ib.* 2448–2459——Total of 237,218 dealers and manufacturers under the supervision of the Excise, *ib* 2453.

See also *Coffee*, I. 6. *Imports. Preventive Measures. Tea*, 4. *Tobacco.*

Bole Armenian. Illustration of the unnatural red colour produced by bole Armenian, the use of which is general, *Hassall* 201–209——Large use of bole Armenian in potted meats and fish, and in sauces; medicinal effect of this substance in some cases, *ib.* 56, 57——Use till lately of bole Armenian by witness's firm in colouring anchovy sauce; harmlessness of the same, *Blackwell* 1576–1579. 1582, 1583——Extent to which their recent abandonment of the use of bole Armenian has been objected to by the public, *ib.* 1580–1587.

Reports, 1855—*continued.*

Bole Armenian—continued.

Harmless character of Armenian bole as used for colouring anchovies, &c., *Redwood* 1821. 1824. 1831, 1832——Nature of the substance used as Armenian bole, there being now no real Armenian bole imported into this country, *ib.* 1830–1832.

Borax. Adulteration some time since in the case of borax; detection and suppression of the same, *Redwood* 1777–1779.

Bottled Fruits and Vegetables. Details relative to the adulteration of bottled fruits and vegetables, copper being used to a large extent for the sake of colour, *Hassall* 5. 39–56——Illustration of the difference in appearance between bottled fruits and vegetables preserved without copper and with copper, *ib.* 201.

Brandy. Extensive manufacture of brandy in this country; by the aid of chemical discoveries it is now made in a very drinkable state, *Normandy* 754. 757. 758.

Bread:

1. *Large Quantity of Alum in Bread.*
2. *Prejudicial Effect of Alum upon the Health.*
3. *Other Substances introduced into Bread.*
4. *Means of detecting Adulteration.*

1. *Large Quantity of Alum in Bread:*

Evidence as to the extensive adulteration of bread with alum, *Hassall* 21; *Normandy* 536, 537. 589; *Simon* 811–813; *Mitchell* 1026; *Postgate* 2110–2115. 2117–2124——Adulteration of bread with alum in the case of forty-nine samples examined by witness, but in no instance with potato, *Hassall* 21——The adulteration of bread and flour consists chiefly of alum. *Normandy* 536——Solitary instance of bread tested by witness without any alum in it, *ib.* 537. 564——Twofold object of the use of alum, *ib.* 537, 538. 565, 566.

Witness has found from 90 to 116 grains of alum in a four pounds loaf, *Mitchell* 1031——Witness has found alum in bread, and knows it to be manufactured for the purpose, *Thomson* 1190. 1196–1198——Bread is not naturally of a white, but rather of a yellowish colour, *Postgate* 2117.

2. *Prejudicial Effect of Alum upon the Health:*

Injury to health through the use of alum in bread, *Normandy* 538–542; *Thomson* 1199, 2000——Opinion that the adulteration should be proceeded against as injurious to health, *Simon* 828, 829——Considerable adulteration of bread, as examined by witness, with alum, boiled potatoes, and inferior flour; injury to health from the use of alum; *Mitchell* 1026–1049. 1063–1068——Prejudicial effects of alum in bread, *Postgate* 2110——Opinion that the ordinary amount of alum in bread is not injurious to health, *Phillips* 2473. 2476–2478.

3. *Other Substances introduced into Bread:*

Witness has found mashed potatoes, "hards," and (though rarely) sulphate of copper, *Hassall* 5. 15——Instance of the introduction of boiled rice into bread, *Normandy* 542——Instances of carbonate of magnesia in bread; object thereof; *ib.* 547–550——Belief that potato starch is not mixed with bread; mashed potatoes in bread are not much to be objected to, *ib.* 551, 552——Witness never found any copper in bread, *ib.* 553——Instance of the use of very filthy water in bread, *ib.* 774——Witness has found bicarbonate of soda in bread; explanation as to this adulteration; *Thomson* 1190–1195.

4. *Means of detecting Adulteration:*

Greater absorption of water by good bread than by inferior bread, *Thomson* 1297–1299 Means by which alum may be detected, *Postgate* 2123.

See also *Flour. France. German Yeast. Plaster of Paris. Unfermented Bread. Wolverhampton.*

Brewers. See *Beer*, 4.

Burton, Charles H. (Analysis of his Evidence.)—Reference to a patent taken out in 1851 by Messrs. Duckworth, of Liverpool, for forming chicory into the shape of coffee berries; it has not been extensively used, 2135–2141.

Butter. Quantity of water and of salt both in fresh and salt butter, *Hassall* 5. 61——Particulars relative to adulterations in butter as sold at Cork; instance of witness, as mayor, having required some bad butter to be destroyed, *Sir J. Gordon* 925–934. 939——Good quality and high price of the butter exported from Cork; inspection necessary, *ib.* 935–938. 981–983.

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C.

Calamine. Use of sulphate of baryta instead of carbonate of zinc for calamine, *Simon* 809, 810; *Letheby* 2787, 2788——Witness has found calamine, so called, to be a preparation of sulphate of baryta, chalk, and ochre, *Thomson* 1507, 1508.

Explanation in regard to the substitution of sulphate of baryta for calamine, *Redwood* 1829, 1830.

Calomel. Doubt as to calomel being much adulterated with chalk, *Sir J. Gordon* 998, 999 ——The examination by witness of fifty-one samples of calomel shows that it is sold by the dealers in a state of great purity; mode in which these samples were obtained, *Redwood* 1687–1693——Witness has found one grain of oxide of lead in ten of calomel, *Postgate* 739.

Carbonate of Potash. Statement that carbonate of potash should not be considered adulterated because chloride of potassium is mixed with it, *Redwood* 1634–1636.

Carbonate of Soda. Evidence showing that any slight impurity in carbonate of soda should not be considered an adulteration; sufficient purity of this substance as generally attainable for all the purposes required of it, *Redwood* 1625, 1631–1634. 1637–1642. 1649–1654——Distinction between carbonate of soda and bicarbonate of soda, *ib.* 1672 ——Bicarbonate of soda, or as it is popularly termed, carbonate of soda, is almost invariably sold by chemists in a pure state; out of forty samples recently tested by witness there was no appreciable amount of impurity in any one of them; how the samples were procured, *ib.* 1675–1687——Circumstance of a sample of bicarbonate of soda brought to witness by Dr. Normandy having contained twelve per cent. of sulphate of soda, *ib.* 1676, 1681.

Explanation with reference to a sample of bicarbonate of soda which was found to contain sulphate of soda, and which was submitted by witness to Mr. Redwood, *Normandy* 1944–1949——Probable reason why the several samples of bicarbonate of soda procured by Mr. Redwood were not impure, *ib.* 1949.

Bicarbonate of soda is now so cheap as hardly to be worth adulterating; different charges made for it adverted to, *Herring* 2005–2007——Bicarbonate of soda is rarely adulterated, *Scanlan* 2876——Witness has rarely found more than two or three per cent. of sulphate of soda in carbonate of soda, *Letheby* 2823.

Cassia. See *Cinnamon.*

Castor Oil. Reference to capsules said to contain concentrated castor oil, but really croton oil, the former being a very mild, and the latter a very violent purgative, *Postgate* 2720–2729——Witness has examined thirty samples of castor oil, not one of which was adulterated, *Letheby* 2793.

Cayenne Pepper. Very great and deleterious adulteration in the case of Cayenne pepper, red lead and other injurious substances being for the most part mixed with it in large quantities, *Hassall* 5. 32–39. 150——The adulteration of Cayenne takes place in this country, *ib.* 37——Corroboration of Dr. Hassall's evidence with regard to the adulteration of Cayenne pepper, *Normandy* 777.

Cayenne pepper is seldom imported in a ground state, but is extensively adulterated in this country, *Simmonds* 2059——Instance of illness through the mixture of red lead with Cayenne, *Postgate* 2696, 2697——Adulteration of soluble Cayenne with copper and vermillion, *Scanlan* 2869.

Central Board. Analysis of all suspected articles suggested to be undertaken by a Central Board, *Hassall* 182——Suggested publication by some central authority of schedules of those adulterations to be proceeded against by the local authorities as hurtful to health, *Simon* 803. 808——Objection to the central authority having generally to undertake the analysis of all suspected articles, as proposed by Dr. Hassall, *ib.* 868–870——The local inspectors should act in concert with a central body of medical authorities who might be connected with the Board of Health, *Thomson* 1559——Objection to a central commission or Board of Examiners, *Wallington* 2611.

Cheese. Exceptional instance in which red lead was found by witness in cheese, *Normandy* 7777.

Chelsea Water Company. Bad quality of the water supplied by this company, *Hassall* 240——Belief that the water is filtered, *Thomson* 1380.

Chemical Analyses. considerations with respect to the person who should undertake the analysis of articles; suitableness and competency for this purpose of the local public health officer, or still more so the poor-law medical officer, *Simon* 795. 797. 814–822. 846–867. 873–876——Recommendations for the appointment of a public analyser in all towns and cities, *Postgate* 2100. 2104. 2127–2129——Suggested appointment by

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Chemical Analyses—continued.

Government of an efficient pharmaceutical chemist, with powers to analyse the drugs sold by any chemist or druggist, *Herring* 1988-1995. 2003, 2004. 2014. 2018, 2019——Time and care necessary in making chemical analyses, *Letheby* 2833-2839.

See also *Central Board.* *Inspection.* *Microscope, The.* *Samples Analysed.*

Chemists and Druggists. Inability of ordinary chemists to detect adulterations, *Normandy* 572, 573——The retail dealers of drugs are as a body strongly opposed to adulteration, and not only do not practise it, but expose and check it to a considerable extent, *Redwood* 1697-1701. 1710, 1711. 1808, 1809——Means by which chemists judge of the quality of the drugs supplied to them for retail sale, *ib.* 1732, 1733. 1816-1819.

Growing education and intelligence of retail dealers adverted to; check exercised by them upon the sale of impure drugs, *Herring* 1990, 1991. 2000-2003. 2021. 2036——Readiness, however, of many chemists and druggists to sell impure articles, *ib.* 1992. 1997. 1998. 2002, 2003——Anticipated satisfaction to chemists and druggists if there were a system of public inspection, *ib.* 2004. 2022——Chemists and druggists do not give advice to customers, *ib.* 2008, 2009.

Insufficiency of an external examination by retail dealers of the drugs supplied to them, *Herring* 2035, 2036——Druggists themselves are imposed upon by manufacturers in regard to the quality of their drugs, *Postgate* 2718-2720.

See also *College of Physicians.* *Drugs.* *Pharmaceutical Society.*

Chicory. Substances with which chicory is adulterated, *Hassall* 5. 15; *Phillips* 2212, 2213—— Considerable adulteration of chicory as shown by the examination by witness, in the first instance of thirty-four samples, and subsequently of eighteen samples procured from manufacturers, *Hassall* 21——Extensive adulteration of chicory with brick dust and ochre, *Normandy* 688-691.

Instance of extensive adulteration of chicory, *Phillips* 2214-2216——Chicory is now grown in this country, *ib.* 2217——Penalties for the adulteration of chicory, *ib.* 2218, 2219——Beetroot yields the best chicory, *ib.* 2422.

See also *Coffee*, I.

China Clay. Use of China clay for adulterating green tea; nature of this substance, *Hassall* 27. 29.

Chloroform. Depreciation frequently as regards chloroform, but less by adulteration than by the action of the elements on each other, *Warington* 526-528.

Chocolate. Extent and character of the adulteration as regards chocolate, *Hassall* 5. 15. 21; *Normandy* 596, 597. 611——Chocolate and cocoa powder are made in this country, and are adulterated by the manufacturer, *ib.* 605-610. 622-631——Excellent properties of chocolate if not adulterated, *ib.* 617, 618. 620, 621.——*See* also *Cocoa.*

Cigars. Rare adulteration in the case of cigars and cheroots, *Hassall* 61.

Cinnamon. Various matters used in the adulteration of cinnamon, *Hassall* 5——Witness has analysed thirty-one samples; considerable adulteration in the majority of these samples, several of them consisting of nothing but cassia, *ib.* 32——Cassia is frequently substituted for cinnamon; consequent evil, *Herring* 2023-2028; *Simmonds* 2050-2055——Loss of about 500 *l.* a year to the Government by the substitution of cassia, *Simmonds* 2046——Cassia pays a duty of only 1 *d.* per pound, while cinnamon pays 2 *d.*, *ib.* 2051.

Cloves. Whole cloves as ordinarily met with are not deprived of any portion of their essential oil, *Hassall* 32.

Cocculus Indicus. Intoxicating and poisonous property of cocculus indicus as used in beer, *Normandy* 701-704. 713; *Phillips* 2311-2313——Instance of a person having died from drinking rum which was strongly impregnated with cocculus indicus, *Normandy* 736. 752——Reduction of duty in the case of cocculus indicus adverted to, *Simmonds* 2068—— Increased price of the article of late years, *ib.* 2072.——*See* also *Beer*, 2.

Cocoa. Different substances with which cocoa is adulterated, *Hassall* 5. 15——Out of fifty-six samples examined by witness, eight only were genuine; nature of the adulteration in the case of the forty-eight samples; also in the case of other samples of different kinds of cocoa, *ib.* 21——Belief that cocoa and chocolate are more adulterated than any other articles, *Normandy* 596——Cheapness of cocoa because of the adulteration, and there being no duty, *ib.* 598, 599.

The preparations of cocoa are chiefly adulterated, the cocoa nibs being however not always free from mixture, *Normandy* 600. 616, 617. 632, 633——Substances discovered by witness in preparations of cocoa; how far injurious, *ib.* 601-603. 627, 628——Numerous samples of cocoa examined by witness over a period of ten or twelve years, *ib.* 603. 612——Immense increase of late in the consumption of cocoa, *ib.* 613.

Difficulty in regard to the use of cocoa nibs, *Normandy* 617. 619. 621——Fraud on the public by the adulteration of cocoa and chocolate, *ib.* 622-625. 629-631——Considerable

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Cocoa—continued.

siderable adulteration of cocoa with starch and ochre before it reaches the grocer, *Mitchell* 1133-1148——Loss of about 2,000 *l.* yearly to the revenue by the adulteration of cocoa, *Simmonds* 2042, 2043.

Result of the examination by witness of several samples of soluble cocoa in 1846; small proportion of earthy matter and large proportion of starch and sugar found in these samples, *Phillips* 2424——If cocoa were sold pure, or only in nibs, there would be hardly any consumption of it, *ib.* 2425. 2428-2430——The ingredients mixed with cocoa are not injurious to health, *ib.* 2426, 2427. 2463——Cocoa nibs are pure cocoa, but the consumption is small, *ib.* 2429, 2430.

Cod Liver Oil. Purity of this oil as sold by the Apothecaries' Company; considerable adulteration in the article generally, *Warington* 508-519——Witness does not believe that cod liver oil is extensively adulterated, *Redwood* 1724——Considerable adulteration in the case of cod liver oil, *Postgate* 2710-2713——It is a rare thing to find cod liver oil adulterated; grounds for this statement, *Letheby* 2793-2807.

Coffee:

I. *Adulteration with Chicory:*

1. Evidence as to the great Extent of the Adulteration.
2. Evidence to a contrary Purport.
3. Means of detecting the presence of Chicory.
4. Properties and Value respectively of Chicory and Coffee.
5. Defence of the Admixture of Chicory.
6. Excise Regulations on the Subject; how far adequate.

II. *Adulteration with other Substances than Chicory.*

III. *Loss to the Revenue by Adulteration.*

I. *Adulteration with Chicory:*

1. Evidence as to the great Extent of the Adulteration:

Very large adulteration of ground coffee with chicory, *Hassall* 5. 15, 16; *Postgate* 2699. 2701——Out of thirty-four samples of ground coffee examined by witness, thirty-one were adulterated, *Hassall* 15——Less adulteration of coffee now than formerly, *ib.* 180, 181——Imposition sometimes practised when coffee is ground in the shop while the purchaser waits for it, *ib.* 197——Sale some years since of fabricated coffee berries adverted to, *ib.*——Considerable extent to which chicory is mixed withcoffee; witness has found it to the extent of seventy-five per cent.. *Normandy* 637. 654663——Whole coffee is not always free from adulteration, *ib.* 685-687.

Detection by witness of a large proportion of chicory in almost every sample of coffee examined by him, *Mitchell* 1117-1121——The adulteration of coffee is practised by the grocer, who generally grinds it, *ib.* 1122, 1123. 1131, 1132——Varying proportions of chichory detected by witness in coffee, the adulteration being greatest in the poorer localities, *Thomson* 1207-1212——Statements as to witness having seen imitation coffee berries produced by a patented machine for the purpose; fraud on the public thereby, *ib.* 1213-1232——Reference to a patent taken out in 1851 by Messrs. Duckworth, of Liverpool, for forming chicory into the shape of coffee berries; it has not been extensively used, *Burton* 2135-2141.

2. Evidence to a contrary Purport:

The result of the examination by the Board of Inland Revenue of 12,483 samples of coffee sold as such shows that by far the largest proportion was not adulterated; the adulteration being $12\frac{9}{10}$ per cent., *Phillips* 2149. 2191, 2192——Average proportion of chicory to coffee in 1853, 1854, 1855, *ib.* 2193——Case of the sale of ninety-five per cent. of chicory and five per cent. of coffee: this, though legal, must have been an accident, *ib.* 2248-2251——The samples of coffee analysed by witness were chiefly suspected samples, *ib.* 2431——Sufficient protection at present to the public in regard to coffee; adulteration, as an abuse, being of very rare occurrence, *Wallington* 2629-2633.

3. Means of detecting the presence of Chicory:

Facilities by which the adulteration of coffee with chicory, &c. may be readily detected, *Normandy* 659. 679-684; *Mitchell* 1127-1130. 1149-1153——Cold water is one means of detecting chicory in coffee, the presence of chicory turning the water very dark, *Postgate* 2703-2705.

4. Properties and Value respectively of Chicory and Coffee:

Depreciation of coffee as a beverage if chicory be introduced into it, *Hassall* 175-177——Chicory is not more than one-third of the price of coffee, *ib.* 179——Fraud on the public by the use of chicory with coffee; price of each article, *Normandy* 637-639. 653——Properties of chicory; it is not injurious to health, and is, to a certain extent, nutritious, *ib.* 651, 652. 669-673. 692, 693——Nutritious property in coffee, *ib.* 674, 675

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Coffee—continued.

I. *Adulteration with Chicory*—continued.

4. Properties and Value respectively of Chicory and Coffee—*continued.*

——Chicory has no nutritive qualities, *Thomson* 1211——Superior dietetical properties of coffee as compared with chicory, *Letheby* 2774-2776.

5. Defence of the Admixture of Chicory:

Belief as to its being a convenience, without any pecuniary loss to the public, that chicory should be mixed with coffee by the dealer, *Phillips* 2203-2211. 2220-2242——Justification of the mixture of chicory and coffee as a benefit rather than an injury to the public, *Wallington* 2520-2532——Statement that there is no real standard of the value of coffee, *ib.* 2520. 2575-2581.

6. Excise Regulations on the Subject; how far adequate:

Unwillingness of Government at one time to prohibit the mixture of chicory with coffee, *Hassall* 171-174——Objection to the permission to sell a mixture of chicory and coffee, *Hassall* 190. 198-200; *Normandy* 665-668. 676, 677——Inadequacy of the present regulations in regard to the sale of pure coffee, *Hassall* 198, 199.

Nature of the regulation for the protection of the public in regard to the sale of pure coffee, and of coffee mixed with chicory; penalty imposed if the mixture be sold without a proper label, or if the customer asks for pure coffee, *Phillips* 2184-2190. 2194-2203. 2243-2245. 2248-2251——Number of mixture samples which have been examined by the Excise; proportion properly labelled, *ib.* 2191, 2192——Practice in the trade to supply chicory and coffee if coffee be asked for, *ib.* 2194. 2196——Explanation as to the dealer not being punished for supplying the mixture unless the customer asks for pure or genuine coffee, *ib.* 2197-2203——Greater vigilance recently exercised by the Excise in regard to coffee, *ib.* 2391.

Sufficiency of the distinction drawn by the Legislature, *Wallington* 2523. 2609——Instance of chicory and coffee having been sold when pure coffee was asked for, *Postgate* 2701, 2702. 2706.

II. *Adulteration with other Substances than Chicory:*

Matters besides chicory found by witness in coffee, *Hassall* 5. 15; *Mitchell* 1124——The only substances besides chicory detected by witness in coffee were roasted corn and parsnips or carrots, *Normandy* 634-637. 694——Witness never found any deleterious ingredient in coffee, *ib.* 682——Mixture of musty and inferior coffee with good coffee, *ib.* 695-697——Deterioration arising from the mode in which coffee is roasted, *ib.* 697.

Witness discovered on one occasion ground bread-crusts in coffee, *Sir J. Gordon* 940-944——Instance of an attempt to adulterate coffee with lupines, *Thomson* 1212——Case of sickness at Birmingham through the use of adulterated coffee, *Postgate* 2100. 2102, 2103——Reference to some compounds attempted at different times to be substituted for coffee, *Phillips* 2419-2421——Witness has found roasted corn, ground cocoa nibs, and mustard, mixed with coffee, *Postgate* 2699.

III. *Loss to the Revenue by Adulteration:*

Calculation that the revenue loses 300,000*l.* a year by the adulteration of coffee, *Simmonds* 2039, 2040.

See also *France.*

College of Physicians. Power, rarely exercised, of the College of Physicians to inspect druggists' shops, and to confiscate impure or adulterated articles, *Warington* 473-480; *Simmonds* 2081, 2082——The College of Physicians do not require absolute purity in drugs, *Redwood* 1631——Advantage if the College of Physicians frequently exercised their power to visit druggists' shops, *Letheby* 2825-2827.

Colonies. Supply respectively by Messrs. Savory, and by the Apothecaries' Company, of medicines required by Government for the colonies, *Letheby* 2849.

Coloured Confectionery. Conclusions arrived at from the analysis of more than 100 samples of sugar confectionery; the colouring materials (which are chiefly to gratify the eye), as well as other substances employed, are exceedingly injurious to health, *Hassall* 5. 15. 65. 93——Serious and fatal consequences often arise, *ib.* 66-69. 150——Increase in the consumption of this confectionery, *ib.* 76——List of injurious substances used, *ib.* 150——Suggested regulations with a view to the prevention of injurious adulteration, *ib.* 182.

Further statements as to the injurious colouring used in sugar confectionery; specimens produced before the Committee, *Hassall* 215-219——List of colouring matters, the use of which may safely be permitted in the colouring of sugar confectionery; they are very inexpensive, *ib.* 219-221.

Witness corroborates Dr. Hassall's evidence in regard to the injurious colouring of sugar confectionery, *Normandy* 776——Improvement of late in the colouring of confectionery, vegetable colours being almost exclusively employed, *Mitchell* 1180-1182——Of all adulterations for the sake of appearance or colour, that of confectionery is the most serious

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Coloured Confectionery—continued.

serious, and has in some instances led to fatal results, *Letheby* 2767–2769——Suggested check upon the colouring of confectionery; certain pigments only should be allowed to be used, *ib.* 2770, 2771.

Colouring Substances. Different matters (some of them very injurious to health) employed for the purpose of colouring various articles, *Hassall* 5——Designation of the colouring of confectionery, pickles, &c. as a conventional adulteration, whether it be injurious to health or not, *Redwood* 1821–1824.

See also *Anchovies. Bole Armenian. Coloured Confectionery. Copper. Pickles. Red Lead. Sauces. Tea*, 2.

Comfits. Substance, consisting chiefly of the oil of grain, with which sweetmeats and comfits are flavoured, *Thomson* 1278–1292.

Competition. System of competition in the trade as to the extent to which adulteration can be profitably carried, *Normandy* 786, 787——Competition in business adverted to as a most useful check upon adulteration, *Redwood* 1788–1796——Inexpediency of interfering with the principle of competition, the same being in the main a sufficient protection against fraudulent adulterations, *Wallington* 2521, 2522. 2529–2538. 2574. 2609——In numerous other articles, as well as isinglass or gelatine, competition between the foreign article and the home article should not be destroyed, *ib.* 2606–2609.——*See* also *Prices. Trade.*

Confectionery. Sundry matters with which confectionery is adulterated and coloured; injury to health thereby; *Hassall* 5. 15. 65–93. 150. 215–219; *Letheby* 2767–2769—— Poisonous properties of matters employed in flavouring confectionery, *Letheby* 2771, 2772.——*See* also *Coloured Confectionery.*

Conventional Adulterations. Importance of drawing a distinction between fraudulent and conventional adulterations, *Redwood* 1665——Definition of conventional adulterations, as distinct from fraudulent adulterations, *ib.* 1665. 1759. 1820–1829. 1832——Many adulterations are the result of conventionalities between the manufacturer, the retailer, and the public, *ib.* 1665——They are practised with a view to suit the taste or prejudice of the public, and are sometimes injurious to health, *ib.* 1821–1824. 1829.

Copaiba. Instance of balsam of copaiba adulterated extensively with linseed oil, *Postgate* 2729–2733.

Copper. Evidence showing the extensive use of copper for the purpose of colouring; inexpediency thereof; *Hassall* 39 *et seq.*——Defence of witness's firm in having coloured their pickles, &c., with copper, on the ground that it was not considered to be actually unwholesome, and was not complained of, *Blackwell* 1574, 1575. 1593. 1599–1602—— Use of copper to colour pickles adverted to, as being practised partly in ignorance as to its injurious effects, *Redwood* 1824–1826.

See also *Bottled Fruits and Vegetables. Olives. Pickles. Preserves.*

Cork. In his official capacity as mayor of Cork, witness has investigated several adulterations of flour, butter, wheat, &c., *Sir J. Gordon* 877–879——Has had the accused parties before him, and has in some instances seized the goods, *ib.* 884. 918–920—— There is a market-jury struck every three months under a local Act; how the same works in checking adulteration, *ib.* 885. 895, 896. 906, 907. 921–924——Exertions of witness (who is himself a chemist), to check adulterations, *ib.* 906–910. 941——There is no fund at Cork whence to defray the expense of chemical analysis for the public, *ib.* 908–910. 977–980——Adulteration and fraud are practised to a fearful degree in Cork, and are carried to an extent injurious to the public health, *ib.* 956–958——Circumstance of witness's attention not having been attracted till lately to the existence of adulteration, *ib.* 1014–1017.——*See* also *Flour*, 2.

Corn. Instances of grain for sale at Cork though in a dreadful state of decomposition, *Sir J. Gordon* 885. 921——Reference to substances made from inferior foreign wheat, *Thomson* 1204–1207——Expediency of a check upon the importation of damaged or adulterated corn from America, *Simmonds* 2093.

Cream. Witness has not hitherto found any adulteration in cream, *Hassall* 32——Reference to arrowroot as a means of making cream, *Sir J. Gordon* 954, 955.

Cream of Tartar. Witness has found cream of tartar to contain one half, and even three parts of alum, *Postgate* 2741.

Crosse & Blackwell, Messrs. Very straightforward and proper manner in which Messrs. Crosse & Blackwell have acted in consequence of the reports in the "Lancet;" discontinuance by them of the practice of colouring their pickles, &c.; *Hassall* 201. 209, 210. 215——Abandonment as far as possible by witness's firm, in consequence of the articles in the "Lancet," of the practice of colouring their pickles and preserves with copper, *Blackwell* 1567, 1568. 1591——The result to witness's firm in changing the green colour of their pickles and fruit has on the whole been rather advantageous, *ib.* 1570–1573.

See also *Anchovies. Bole Armenian. Copper. Pickles.*

Reports, 1855—*continued.*

Curry Powder. Adulteration of nineteen out of twenty-six samples of curry powder analysed by witness; sundry ingredients used, some of them being of a very deleterious character, *Hassall* 5. 39.

Cyanide of Potassium. Explanation relative to cyanide of potassium, as used in electro plating, to the effect that it is not pure, because there is a greater demand for it in an impure and cheap state, *Redwood* 1620–1624——Mixture of pearlash with cyanide of potassium to the great inconvenience of electro platers, *Postgate* 2697-2699.

D.

Damaged Goods. Frequent clearance sales at the docks of damaged goods, which are probably used in adulteration. *Simmonds* 2083.

De Jongh's Cod Liver Oil. This oil is less likely to disagree with the stomach than other cod-liver oil, *Letheby* 2808.

Detection of Adulterations. Increased facilities generally of late years for detecting adulterations, *Phillips* 2386-2390.

See also *Beer*, 5. *Bread*, 4. *Chemical Analyses. Coffee*, I. 3. *Inspection. Microscope, The.*

Dilutions. See *Beer. Gin. Milk. Rum. Spirits.*

Druggists. See *Chemists and Druggists. Drugs*, 3.

Drug Grinders. See *Drugs*, 4.

DRUGS:

1. *Evidence as to the Adulterations being General and Injurious.*
2. *Evidence to a contrary Purport.*
3. *How far the Wholesale Druggist is responsible.*
4. *Considerable Adulteration by the Drug Grinder.*
5. *Inferior Drugs supplied to Boards of Guardians.*

1. *Evidence as to the Adulterations being General and Injurious:*

Nearly all drugs, whether English or Foreign, are adulterated, *Hassall* 140——List of medicinal and other substances examined by witness, with a statement of the adulteration in each case, *Normandy* 778–781——Great importance of checking the great and varied amount of adulteration in drugs, the same now leading to the uncertainty of pharmaceutical preparations, *Simon* 837–842.

Remarks on the adulteration of drugs to the effect that the practice is extensive, and is very injurious on the point of health, *Sir J. Gordon* 985–997. 1018; *Thomson* 1456–1458. 1470, 1471. 1526–1532. 1552; *Herring* 1953. 2001——Importation from England of all drugs used in Cork or Ireland generally; the adulteration taking place before importation, *Sir J. Gordon* 996. 1000–1003.

The practice of adulteration is just as bad as in 1838, when the attention of the Legislature was drawn to the matter, *Thomson* 1474–1477——Sometimes the article does not contain any of the substance by the name of which it is called, *ib.* 1485——Constant complaint by medical men as to the way in which prescriptions are made up, *ib.* 1512–1515. 1552——Adulterations detected by witness in certain drugs, and in chemicals used in medicine, *Scanlan* 2870–2874——Pure quality however of the drugs sold at some of the drug houses and chemists shops in London, *ib.* 2877.

2. *Evidence to a contrary Purport:*

Facility for procuring good drugs in London, or any part of the country, *Redwood* 1625——Sundry articles adverted to as being met with in commerce sufficiently pure for the purpose for which they are required, *ib.* 1625. 1631–1634——The result of witness's experience shows that many drugs are adulterated, but that there is less adulteration than formerly, *ib.* 1643–1645——Difference naturally in the quality of drugs, *ib.* 1648. 1720, 1721——As regards the use of adulterated drugs in making up prescriptions, the evil is much less than has been represented, the great majority of drugs being used irrespectively of prescriptions, *ib.* 1654–1656——Witness admits that adulterations and frauds are practiced in certain cases, but considers the statements on the subject have been much exaggerated, *ib.* 1658-1661.

Further evidence as to the purity of several chemical products before referred to, *Redwood*, 1672 *et seq.*——Different price of the drug in its crude state and in its powdered state adverted to, as indirectly a cause of adulteration, *ib.* 1706–1708. 1714, 1715——The practice of adulteration, though till recently very general, is to a great extent falling into disuse, *ib.* 1706. 1709——Practice of some physicians to recommend their prescriptions to be made up at particular shops; reason for their doing so, *ib.* 1718–1723. 1738-1743.

Reports, 1855—*continued.*

Drugs—continuhd.

2. *Evidence to a contrary Purport*—continued.

Sale of damaged or naturally inferior drugs by some chemists, *Redwood* 1730–1732 ——Enumeration of the several cases of fraudulent adulteration of drugs which have been brought to light during the last fourteen years, and which have been exposed in the journals published by the Pharmaceutical Society, *ib.* 1761–1788. 1797–1799——The quality of drugs has decidedly improved of late years, and is still improving; causes to which owing; *ib.* 1800–1808.

3. *How far the Wholesale Druggist is responsible:*

Circumstance of a certain druggist being willing to supply any powder at 36 *s.* per cwt., *Thompson* 1480–1484 ——Cognizance of wholesale druggists in regard to adulteration by the drug-grinders, *Redwood* 1705——In some instances the wholesale druggists grind their own drugs, *ib.* 1709. 1712, 1713——Some druggists justify the sale of inferior drugs on the ground that the price given for them does not admit of their supplying a better article, *ib.* 1734–1737——Precaution exercised by witness's firm before they purchase opium, &c., *Herring* 1982–1986——Reluctance of wholesale druggists to buy bad articles, *Letheby* 2847.

4. *Considerable Adulteration by the Drug Grinder:*

Large amount of adulteration practised by the drug-grinder, *Hassall* 131–140; *Warrington* 460–462; *Sir J. Gordon* 990——Statements by Mr. Redwood and Dr. Thompson adverted to hereon, *Hassall* 221——The greatest amount of adulteration in drugs is practised probably by the drug-grinders; explanation hereon; *Redwood* 1700–1704. 1710——Cause of the use of sawdust in the adulteration of drugs, *ib.* 1704——Adulteration of drugs mainly by the mixture of inerit matter, such as sawdust, with powdered drugs, by the drug-grinder, *Letheby* 2776–2778——Inexpediency of what is termed the four per cent. system between the druggist and the drug-grinder, *ib.* 2776.

5. *Inferior Drugs Supplied to Boards of Guardians:*

Practice in regard to the supply of drugs to Boards of Guardians; mistaken economy in contracting at a low price, *Sir J. Gordon* 997. 1004–1008——Inferior quality of the drugs supplied in the case of paupers, *Thomson* 1478, 1479——Inexpediency of public bodies, such as Poor Law Boards, &c., contracting for drugs at a low rate, *Herring* 2010–2017.

See also *Alkaloids. America. Apothecaries' Hall. Calamine. Calomel. Carbonate of Potash. Carbonate of Soda. Chemists and Druggists. Cod Liver Oil. Exported Drugs. Impurities. Iodide of Potassium. Liquorice Powder. Milk of Sulpur. Morphia. Opium. Quinine. Rhubarb. Scammony. Thomas's, St., Hospital.*

E.

Education. Improved education is the best mode of checking adulterations, *Redwood* 1645, 1646——Though a system of inspection would prevent much adulteration, witness looks upon the better education of chemists and druggists, and of the public, as the principal check, *Scanlan* 2880.

Emery. Mixture of the rust of iron with emery, *Postgate* 2697.

Essential Oils. Essential oils and fruity essences are now largely supplied by chemists to perfumers and distillers, *Normandy* 754–757——Essential oils are much adulterated with common oils; instances of this, *Postgate* 2706, 2733–2739.

Excise, The. See *Board of Inland Revenue.*

Exported Drugs. Statement showing the impurity of the drugs, &c. exported from this country to America, *Simmonds* 2061–2063, *and pp.* 43, 44——Medicines are largely exported to America, *Letheby* 2848.

Exposure. Great importance of publicity in the case of any adulteration, *Simon* 794. 853 ——Non-repetition of fraudulent adulterations of drugs after they have been once detected, *Redwood* 1759–1765. 1796. 1803, 1804——Doubt as to the disclosures before the Committee leading to the sale of gin in a less adulterated state, *ib.* 1908.

See also "*Lancet,*" *The. Pharmaceutical Society.*

Extract of Colocynth. Spurious article sold for proper extract of colocynth, *Postgate* 2706, 2707.

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F.

Fines. The seller of adulterated articles should be punished by the infliction of fines, and the actual adulterator by fine or imprisonment, or both, *Hassall* 182.

Fletcher, Mr. Bell. Letter to witness from Mr. Bell Fletcher, physician at Birmingham, showing the great importance of preventing adulteration in drugs, *Postgate* 2752.

FLOUR:

1. *Generally.*
2. *Cork.*

1. *Generally:*

Use of alum for the purpose of adulteration, *Hassall* 5——Other matters said to be used, *ib.* 15——There was a mixture of alum in four samples out of eight examined by witness, *ib.* 21——Introduction of both water and alum into flour before it reaches the baker; rare exceptions to the introduction of alum, *Normanby* 557-564——The use of the meal of beans and peas in flour is an exceptional adulteration, *ib.* 567.

Adulteration of flour with sulphate of lime and chalk, *Mitchell* 1050-1062——Witness has found the adulteration to consist mainly of inferior flour, *Thomson* 1187-1189. 1196——Evidence as to the adulteration of flour, more especially with alum; injurious effect thereof upon the health, *Postgate* 2105-2124——Instance of the use of flour made from decomposed wheat, *ib.* 2116——Instance of dangerous adulteration of flour with chalk, *Letheby* 2768.

2. *Cork:*

Instance of the sale of adulterated flour, which had suffered decomposition, and was very injurious to health; steps taken to fine the seller, who however disappeared from the city, *Sir G. Gordon* 879-881. 886. 891-894. 919. 967——Cases of adulteration are constantly brought before witness, as mayor, *ib.* 882, 883——Good effects produced by the exposure in the case of decomposed flour before alluded to, though adulterated flour is still sold, *ib.* 886, 901-905. 911-913. 968. 969. 984,

Importation from England to Ireland of a spurious substance to mix with flour, and of adulterated flour, *Sir G. Gordon* 887-889. 970-974——Sundry farinaceous matters which are mixed with flour, *ib.* 915——Adulteration both by the wholesale miller and the retailer, *ib.* 916, 917. 962-965——Opinion that flour exported from Cork is not adulterated previously, *ib.* 959-962.

See also *Act 6 & 7 Will. 4, c. 37.* *Wolverhampton.*

Foreign Adulterations. Course which ought to be pursued in order to prevent adulterations abroad, as in the case of opium, tea, &c., *Hassall* 296, 297. 304-307——Opium, scammony, senna, &c. are adulterated before importation, *Redwood* 1808, 1809——A good deal of the adulteration is done abroad, *Simmonds* 2089——There is not much fraudulent adulteration of drugs before importation, *Letheby* 2846.

Foreign Countries. Less adulteration is practiced in France, America, &c. than in this country, *Hassall* 154, 155——Favourable working of regulations in America, Prussia, &c. for preventing adulteration, *ib.* 321-323. 326——State of the law in foreign countries with a view to the prevention of adulterations, *Simmonds* 2061.

See also *America.* *France.* *Prussia.*

France. Stringent regulations in France for the prevention of adulteration by bakers; salutary operation thereof; *Normandy* 543-547——Practice in France in regard to the mixture of chicory and coffee, *ib.* 641-650——Constitution and operation of the Conseil de Salubrité in Paris; beneficial results thereof, *ib.* 785, 786——Reference to the attempt by the French Government to suppress the practice of mixing sulphate of copper with bread, *Redwood* 1826-1828——It would be exceedingly desirable to subject bakers, &c. to supervision, as in France, *Postgate* 2125-2127——Check in France upon the colouring of confectionery, *Letheby* 2845.

G

Gelatine. See *Isinglass.*

Gentian. Purpose for which gentian is used in beer; it is not a deleterious substance, *Normandy* 707, 708.

German Yeast. Witness does not object to the use of German yeast in bread, *Mitchell* 1070-1072.

GIN:

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GIN:

1. *Generally, as to the Extent and Impropriety of the Adulteration.*
2. *Defence of the Adulteration or Dilution.*

1. *Generally, as to the Extent and Impropriety of the Adulteration:*

Different matters used in the adulteration of gin, *Hassall* 5. 15——Great variety in the amount of alcohol in thirty-eight samples of gin, all of which were more or less diluted and adulterated; some of the ingredients being injurious to health; *ib.* 93-95. 150, 151——Substances from which pure gin is made; nature of the flavourings used; *Hassall* 97-101. 105, 106; *Normandy* 743-749——Gin is more used in London than other spirits, *Hassall* 112.

Sundry substances used by the brewer for adulterating gin, *Normandy* 735, 736——Object of using grains of paradise in gin, *Normandy* 735; *Phillips* 2314——Very injurious character of the adulterations, *Normandy* 737-739——Pure gin is not to be had from the publicans, *ib.* 740——Large quantities of gin consumed in London in a raw state, *ib.* 750, 751.

Witness has found the adulteration to be chiefly in the strength, *Mitchell* 1114-1116——Non-concurrence in Mr. Redwood's statement that the retail dealer in gin makes his profit by adulteration, and that the practice is necessary as a means of concealing his profit, *Simmonds* 2041——Unnecessary deterioration in the quality of gin by the adulteration said to be practised by the retailer, *Scanlan* 2862. 2865-2868.

2. *Defence of the Adulteration or Dilution:*

Evidence in explanation of the adulteration or rather the dilution of gin by the publican; defence of the same as being done to suit the public taste, as not being injurious to health, and being the means whereby the publican obtains his profit and is enabled to conceal such profit from the public, *Redwood* 1836 *et seq.*——Process of fining gin explained and defended, *ib.* 1839. 1886——Doubt as to coculus Indicus being much used in gin, *ib.* 1851-1854——Vague nature of statements made to the Committee in regard to the adulteration of gin, *ib.* 1884-1886. 1928.

Extent to which oil of almonds and oil of vitriol are used for the production of artificial strength; this practice is termed "beading," and is in exceptional cases only, carried to an extent injurious to health, *Redwood* 1899-1901. 1909-1913. 1924-1934——Rare use of Cayenne pepper as an ingredient in the adulteration of gin, *ib.* 1914, 1915——Witness does not consider "beading" an adulteration, *ib.* 1929-1932——Scarcely appreciable difference of taste between gin as sold by the distiller and by the publican, *ib.* 1935-1937.

Examination as to the Board of Inland Revenue not considering the mixture of water with gin or other spirit as adulteration; opinion that such mixture does not entail any loss to the revenue, and is rather a convenience and advantage than otherwise to the public, *Phillips* 2252, *et seq.*——The mixture of ingredients injurious to health with gin would be considered by witness as an adulterarion, but he is not aware that such mixtures are practised, *ib.* 2279-2295.

See also *Grains of Paradise.*

Ginger. Different substances with which ginger is adulterated, *Hassall* 5——Adulteration in fifteen out of twenty-one samples examined by witness, *ib.* 32——Loss to the revenue by the adulteration, *Simmonds* 2046.

Gordon, Sir John. (Analysis of his Evidence.)—Mayor of Cork, 877——In his official capacity has investigated several adulterations; flour, butter, and wheat, &c.; 878, 879——Instance of the sale of adulterated flour which had suffered decomposition and was very injurious to health; steps taken by witness to fine the seller, who, however, disappeared from the city, 879-881. 886. 891-894. 919. 967——Cases of adulteration in flour are constantly brought before witness, 882, 883——Witness has had the accused parties summoned before him, and has in some instances seized the goods, 884. 918-920——There is a market jury struck every three months, under a local Act; how the same works in checking adulterations; 885. 895, 896. 906, 907. 921-924.

Instances of grain for sale, though in a dreadful state of decomposition, 885. 921——Good effect produced by the exposure in the case of decomposed flour before alluded to, though adulterated flour is still sold, 886. 901-905. 911-913. 968, 969. 984——Importation from England to Ireland of a spurious substance to mix with flour, and of deteriorated flour, 887-889. 970-974——Inoperative character of the Act 6 & 7 Will. 4, c. 37, 897-900——Exertions of witness (who is himself a chemist) to check adulterations, 906-910. 941——There is no fund at Cork whence to defray the expense of chemical analysis for the public, 908-910. 977-980——Sundry farinaceous matters which are mixed with flour, 915——Adulteration both by the wholesale miller and the retailer, 916, 917. 962-965.

Particulars relative to adulterations in butter as sold at Cork; instance of witness having required some bad butter to be destroyed, 925-934. 939——Importance of the microscope in detecting adulterations, 928——Good quality and high price of the butter

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Gordon, Sir John. (Analysis of his Evidence)—*continued.*

exported from Cork; inspection necessary; 935–938. 981–983——Witness discovered, on one occasion, ground bread crusts in coffee, 940–944——Belief as to adulteration in the case of tea, bread, or other articles when sold at a very low rate to the poor, 946, 947——Constant adulteration in the case of milk at Cork, chalk however not being used; means of detecting the same, 948–954——Reference to arrowroot as a means of making cream, 954, 955.

Adulteration and fraud are practiced to a fearful degree in Cork, and are carried to an extent injurious to the public health, 956–958——Opinion that flour exported from Cork is not adulterated previously, 959–962——Importance of the chief magistrate of any place taking vigorous steps to suppress injurious adulterations, 966——A microscope for domestic purpose may be bought for about 20*s.*; 976.

Remarks upon the adulteration of drugs, to the effect that the practice is extensive, and is very injurious on the point of health, 985–997. 1018——Importation from England of all drugs used in Cork, or Ireland generally, the adulteration taking place before importation, 996. 1000–1003——Practice in regard to the supply of drugs to Boards of Guardians; mistaken economy in contracting at a low price; 997. 1004–1008——Doubt as to calomel being much adulterated with chalk, 998, 999——Approval of a system of inspection of drugs and food in all large towns, 1009–1013——Circumstance of witness's attention not having been attracted till lately to the existence of adulteration, 1014–1017.

Grains of Paradise. Object in using grains of Paradise in gin, *Normandy* 735; *Phillips* 2314——Use of grains of Paradise for giving pungency to ale, *Mitchell* 1086, 1087——Inoperative check upon the sale of grains of Paradise to brewers or publicans, *ib.* 1089–1092——There is nothing prejudicial to the health in the mixture of grains of Paradise with hops, *Phillips* 2306–2311——Penalty imposed by the Excise in case of the use of quassia and grains of Paradise, *ib.* 2314–2316.

Gutta Percha. Mode in which gutta percha is sometimes adulterated, *Simmonds* 2089.

H.

Hassall, Arthur Hill, M.D. (Analysis of his Evidence.)—Doctor of Medicine of the University of London, and Member of the College of Physicians, 1——Has devoted considerable attention to the subject of adulteration generally, 2——Few exceptions to the practice of adulteration, whether in the case of food, of drink, or of drugs, 3–5——Classified list of articles analysed by witness, with a statement of the various substances employed for the purpose of adulteration, 5——Different matters employed for the purpose of colouring, *ib.*——In many instances the adulteration is injurious to health, and even poisonous, 6.

Use of the microscope by witness (as well as of chemistry) in detecting the adulterations, 7, 8——Conviction as to the accuracy of the results arrived at by witness, 9——Means by which the samples for analysis were procured; great care taken on this point, 10–15——List of articles ascertained by others than witness to be adulterated, with a statement of the matters used in the adulteration, 15——Evidence showing in detail the frequency and extent of the adulteration in the case of the samples analysed from time to time by witness, 15 *et seq.*

Out of thirty-four samples of ground coffee thirty-one were adulterated, 15——Very large adulteration of ground coffee with chicory, 15, 16——Caution observed in the sale of mixed chicory and coffee without a label, since the publication of the first report on the subject in the "Lancet," 16——Considerable extent to which brown sugar is adulterated with various substances as shown by the anaysis of thirty-six samples by witness, *ib.*——Less extent of adulteration in the case of fifteen samples of lump sugar, *ib.*——In the case of several samples of arrowroot analysed by witness, the great majority were largely adulterated; particulars hereon; 16, 17.

Result of the examination of forty-three samples of black and white pepper; less adulteration since some recent convictions by the Excise; 17——Genuine mustard is scarcely ever to be obtained; forty-two samples tested by witness were all adulterated, more or less, with wheaten flour and turmeric; *ib.*——Material effect of the adulteration upon the utility of mustard as a medical appliance, 18–20——Considerable adulteration of chicory as shown by the examination in the first instance of thirty-four samples, and subsequently of eighteen samples procured from manufactories, 21.

Adulteration of bread with alum in the case of forty-nine samples, but in no instance with potato, 21——Mixture of alum with flour in the case of four samples out of eight, *ib.*——Out of fifty-six samples of cocoa eight only were genuine; nature of the adulteration in the case of the forty-eight samples; also in the case of other samples of different kinds of cocoa, *ib.*——Extent and character of the adulteration as regards chocolate, *ib.*——With respect to oatmeal sixteen out of thirty samples were adulterated with large proportions

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Hassall, Arthur Hill, M. D. (Analysis of his Evidence)—*continued.*

of barley-meal, while others contained the refuse hulk or rubble, 21——Illustration of the injurious effect of the adulteration of oatmeal, 22, 23.

Detailed statement as to the adulteration of black and green tea, both in its imported state, and as purchased from dealers in this country, 23–31——Considerable extent to which lie tea is substituted for the genuine article; character of lie tea; 23. 27, 28——Different colouring matters used in the case of black tea and green tea, 23. 27——More injurious colouring substances used in this country than in China, 29——Course adopted so as to prevent detection when plum or sloe leave are mixed with tea, 29–31.

Out of twenty-six samples of milk tested by witness twelve were genuine; the adulteration consisted of water only, chalk or sheep's brains not being used in any instance, 31——Witness has not hitherto found any adulteration in cream, 32——Out of twenty-eight samples of isinglass ten consisted entirely of gelatine, *ib.*——Conclusions deduced from the examination of several samples of vinegar; injurious adulteration hereon, more especially by the manufacturers, *ib.*——Very injurious adulteration in the case of pickles, *ib.*——Adulteration in fifteen samples out of twenty-one samples of ginger, *ib.*

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Oatmeal. Different matters used in the adulteration of oatmeal, *Hassall* 5——Sixteen out of eighteen samples, examined by witness, were adulterated with large proportions of barley meal, while others contained the refuse hulk or rubble, *ib.* 21——Illustration of the injurious effect of the adulteration of oatmeal, *ib.* 22, 23——Instance of extensive adulteration of oatmeal, *Thomson* 1200, 1201.

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Opium. Evidence in detail relative to the adulteration of opium, *Hassall* 5. 117–146; *Warington* 449. 451; *Normandy* 779; *Letheby* 2776–2779——Results of the analyses of twenty-three samples of gum opium, and thirty-four samples of powdered opium, *Hassall* 117——Great importance of opium being sold in a pure state, *ib.* 118–123——Check placed by the East India Company upon the adulteration of opium, *ib.* 128. 142, 143. 350–353——Extent of adulteration by the grower, *ib.* 128, 129. 141——Belief that no adulteration takes place in the factories of the East India Company, *ib.* 128. 142, 143——The best opium comes from Turkey, *ib.* 298. 354.

Course adopted at Apothecaries' Hall, so as to insure the supply of a genuine article, *Warington* 452–458——Belief as to one half of foreign matter being sometimes introduced, *Sir J. Gordon* 985, 986——Instance of excessive adulteration of opium, *Thomson* 1486, 1487——Belief as to the purity of the East India opium when it leaves the Company's factories, *ib.* 1494–1504.

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Opium is imported of necessity in an adulterated state, but sometimes it is so excessively adulterated as to be useless, *Herring* 1965–1967——Opium comes generally from Aleppo and Smyrna, there being but little imported from the East Indies, *ib.* 1977–1981——It is imported only by a few merchants in London, *ib.* 1982.

Increase of late years in the consumption of opium in this country, *Simmonds* 2073–2080——Belief as to Indian opium being imported, and being equal to Turkish opium, *ib.* 2078, 2079——Increased use of opium in America adverted to, *ib.* 2080——Necessary introduction of sandy matter in pulverizing opium, *Letheby* 2776——The introduction of extraneous matter is not necessary in powdering opium, *Scanlan* 2879.

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Oxide of Copper. Memorandum, as submitted by Mr. Warington to the Chemical Society in 1832, on a method of detecting, qualitatively, small quantities of oxide of copper in solution, *App. p.* 137.

Oxide of Zinc. Reason why the oxide of zinc sold generally by chemists is not a pure product; respect in which this adulteration is of a conventional nature, *Redwood* 1832, 1833.

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Paris. See *France.*

Patent Medicines. Composition and sale of certain pills and patent medicines adverted to, *Herring* 2032–2034.

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Pepper. Pepper is adulterated to a considerable extent; substances employed, *Hassall* 5. 15; *Normandy* 777, 778——Result of the examination by witness of forty-three samples of black and white pepper; less adulteration since some recent convictions by the Excise, *Hassall* 17——Amount of loss to the revenue by the adulteration, *Simmonds* 2046——Mode of adulteration of black pepper, *ib.* 2058——Mode of adulteration of white pepper, *ib.*

Adulteration in the case of 576 out of 1,116 samples of peppers tested by the Board of Inland Revenue; sundry ingredients used, *Phillips* 2410–2415——With the exception of gypsum, the ingredients for adulteration are not hurtful to health, *ib.* 2411–2413——Facility for detecting adulteration, *ib.* 2414. 2432——Substances which used to be mixed with African pepper, *ib.* 2415.

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Pharmaceutical Society. Witness has been Professor of Chemistry and Pharmacy to the Pharmaceutical Society for the last fourteen years, and for the greater part of that time curator of the society's museum, *Redwood* 1618, 1619——The society numbers about 3,000 members, and has promoted in every way the suppression of adulteration, *ib.* 1619——It has been established between fourteen and fifteen years, *ib.* 1938——Its object was the improvement of pharmacy and the better supply of drugs, *ib.* 1939. 1943——It comprises among its members nearly all the leading people of the country engaged in the trade of vending drugs, *ib.* 1940–1942.

Improvement of late years in the quality of drugs through the operation of the Pharmaceutical Society, and the better education of chemists, *Letheby* 2790–2792. 2821, 2822——The society consists entirely of chemists and druggists, *ib.* 2824——Doubts as to there being a compulsory examination of each member of the society, *Scanlan* 2875, 2876.

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Particulars relative to the staff of chemical officers attached to the Board of Inland Revenue, 2175–2180——Regulations for the protection of the public in regard to the sale of pure coffee, and of coffee mixed with chicory; penalty imposed if the mixture be sold without a proper label, or if the customer asks for pure coffee; 2184–2190. 2194–2203. 2243–2245. 2248–2251——The result of the examination of 12,483 samples of coffee, sold as such, shows that by far the largest proportion was not adulterated, 2191, 2192——Number of mixture samples which have been examined; proportion properly labelled; *ib.*——Average proportion of chicory to coffee in 1853, 1854, and 1855; 2193.

Practice in the trade to supply chicory and coffee, if coffee be asked for, 2194. 2196——Explanation as to the dealer not being punished for supplying the mixture, unless the customer asks for pure or genuine coffee, 2197-2203——Belief as to its being a convenience, without any pecuniary loss, to the public that chicory should be mixed with coffee by the dealer, 2203–2211. 2220–2242——Substances with which chicory is adulterated, 2212, 2213——Instance of extensive adulteration of chicory, 2214–2216——Chicory is now grown in this country, 2217——Penalties for the adulteration of chicory, 2218, 2219——Case of the sale of ninety-five per cent. of chicory and five per cent. of coffee; this, though legal, must have been an accident, 2248–2251.

Examination as to the Board of Inland Revenue not considering the mixture of water with gin or other spirit as an adulteration; opinion that such mixture does not entail any loss to the revenue, and is rather a convenience and advantage than otherwise to the public, 2252 *et seq.*——The mixture of ingredients injurious to health with gin would be considered by witness as an adulteration, but he is not aware that such mixtures are practised, 2279–2295——Non-supervision by the Excise in regard to foreign wine, 2296–2298——Slight interference in regard to British wines, 2299——Opinion as to vinegar having been but slightly adulterated when it paid duty and came under the supervision of the Excise, 2300, 2301.

Probability of the Excise having been defrauded by the mixture of barley with malt, 2302, 2303——Hops are charged with duty at the planter's, 2304——Number of samples of hops examined by witness's department in each year since 1842; proportion adulterated, and different substances used for the purpose, 2304–2314——Penalty imposed in case of the use of quassia and grains of Paradise, 2314–2316——Practice in regard to the visits of Excise officers to breweries with a view to the detection of frauds on the revenue, 2317–2324.

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Result of the examination by witness of several samples of soluble cocoa in 1846; small proportion of earthy matter, and large proportion of starch and sugar found in these samples, 2424——If cocoa were sold pure, there would be hardly any consumption of it, 2425. 2428-2430——The ingredients mixed with cocoa are not injurious to health, 2426, 2427. 2463——With regard to the samples of coffee analysed by witness, they were chiefly suspected samples, 2431——Samples of tea, &c., have been supplied to Dr. Hassall by the Board of Inland Revenue, 2432——Facilities of the Board for the detection of adulterations, 2433-2445. 2449-2459.

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Inexpediency of a general system of inspection in order to protect the public against adulteration, 2466-2473——Opinion that the ordinary amount of alum in bread is not injurious to health, 2473. 2476-2478——Witness never heard of plaster of Paris being mixed with bread, 2474. 2475——Exaggerated character of Dr. Hassall's statements in regard to adulteration; experience of witness in the matter as compared with Dr. Hassall; 2479-2493——There have only been about four prosecutions by the Excise for the adulteration of beer, 2486, 2487——The samples of beer which were examined, came chiefly from brewers, 2500, 2501.

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Practice of the trade for the last thirty-five years in making pickles, to use copper vessels in boiling the vinegar, their being several processes so as to give a good colour to the pickles, *Blackwell* 1563-1566. 1603——By some of the more respectable firms, pickles are now made less green than formerly, *ib.* 1569——Approval of the prohibition of adulteration in pickles and sauces, &c.; the public would soon prefer the genuine article; *ib.* 1609-1615.

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Pimento. In one instance, witness found that mustard husk was mixed with pimento, *Hassall* 5——On account of its cheapness, pimento is rarely adulterated, *ib.* 32.

Plaster of Paris. Deleterious nature of plaster of Paris as used in coloured confectionery, *Hassall* 89-93——Witness never found plaster in bread, but believes it is sometimes used, *Normandy* 550. 571——Injurious adulteration of sweetmeats and comfits with terra alba or plaster of Paris, *Thomson* 1276-1278——Witness never heard of plaster of Paris being mixed with bread, *Phillips* 2474, 2475.

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Poorer Classes. Injury and fraud, especially to the poor, by the practice of adulteration, *Hassall* 290-295. 303——Adulteration of bread chiefly as sold to the poor, *Normandy* 562, 563——Belief as to adulteration existing in the case of tea, bread, or other articles when sold at a very low rate to the poor, *Sir J. Gordon* 946, 947——The poor are invariably the victims, *ib.* 947——Inferior or adulterated drugs are, generally speaking, confined to the poorer neighbourhoods, *Redwood* 1722. 1746-1749.

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Prejudicial effects of alum in bread; proportion in which witness has found the alum to exist, 2110-2115. 2117-2124——Instance of the use of flour made from decomposed wheat, 2116——Bread is not naturally of a white, but rather of a yellowish colour, 2117——Extent of adulteration by a baker at Leicester, 2118——Means by which alum in bread may be detected, 2123—— It would be exceedingly beneficial to subject bakers, &c. to supervision, as in France, 2125-2127——Modes in which the practice of adulteration might be punished, 2129-2134.

[Second Examination.]—Reference to four samples of flour and bread from Wolverhampton, each of which contained alum, 2685——A sample of tea from the same place contained beech leaves and catechu, *ib.*——Committee established at Wolverhampton for the detection of adulterations, 2686, 2687——Obstacles which prevented the establishment of a manufactory at Birmingham for pure mustard, 2687-2689——Considerable adulteration of mustard with flour and turmeric; great depreciation thereby of its value as a medical appliance, 2690-2696.

Instance of illness through the mixture of red lead with Cayenne, 2696, 2697——Mixture of the rust of iron with emery, 2697——Mixture of pearlash with cyanide of potassium, to the great inconvenience of electro-platers, 2697-2699——Considerable adulteration of coffee with chicory and roasted corn, 2699. 2701——Witness has also found ground cocoa nibs and mustard mixed with coffee, 2699——Period for which the adulterations of drugs, &c. have attracted witness's attention, 2700——Instance of chicory and coffee having been sold, when pure coffee was asked for, 2701, 2702. 2706——Cold water is a means of detecting chicory in coffee, 2703-2705.

Essential oils are much adulterated with common oils; instances of this; 2706. 2733-2739—— Spurious article sold for proper extract of colocynth, 2706, 2707——Injury to health through the sale of adulterated drugs, 2706. 2715, 2716. 2722, 2723. 2729, 2730. 2739. 2748——Fraudulent adulteration of quinine with salicine and quinidine, 2707-2709——Witness has found tamarinds acidified with sulphuric acid, 2709, 2710——Considerable adulteration in the case of cod-liver oil, 2710-2713——Injurious adulteration of milk of sulphur with sulphate of lime or plaster of Paris, 2713-2716——Instances of extensive and fraudulent adulteration of scammony with chalk and starch, 2716, 2717.

Druggists themselves are imposed upon by manufacturers in regard to the quality of their drugs, 2718-2720——Particulars relative to the adulterations of several other drugs, &c., as tested by witness, 2720 *et seq.*——Different prices charged in different cases for the same drug, on account of the greater or less adulteration, 2742, 2743. 2746-2748——Discrepancy between the London College Pharmacopœia and the pharmacopœia used by some druggists, 2744-2749——Great difference in the component parts and the price of spirits of rosemary, as used in gin, and as in its genuine state, 2749-2752.

Letter to witness from Mr. Bell Fletcher, physician in Birmingham, showing the great importance of preventing adulteration in drugs, 2752——Letter from Mr. M. Banks to a similar purport, suggesting also a check upon the importation of impure drugs, 2752, 2753——Witness has never found quinine adulterated with Epsom salts, 2754.

Potted Meats and Fish. Results obtained from the examination of potted meats and fish; use of bole Armenian for colouring, *Hassall* 5. 56.

Preserves. Considerable quantity of copper in different kinds of preserves and jams, *Hassall* 5, 57-61——Mixture of salts of copper, including the acetate, with preserves, *ib.* 5——Injurious use of copper in preserved rhubarb; case in point; *ib.* 39-42——Great quantity of copper contained generally in preserved green-gages, *ib.* 55. 61.

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Prevalence of Adulterations. Few exceptions to the practice of adulteration, whether in the case of food, of drink, or of drugs, *Hassall* 3. 5——Classified list of articles analysed by witness, with a statement of the various substances employed for the purpose of adulteration,

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teration, *Hassall* 5——Conviction as to the accuracy of the results arrived at by witness, *ib.* 9——List of articles ascertained by others than witness to be adulterated, with a statement of the matters used in adulteration, *ib.* 15——Evidence showing in detail the frequency and extent of the adulteration in the case of the samples analysed from time to time by witness, *ib.* 15 *et seq.*

Nearly every substance of food in London is more or less adulterated, *Mitchell* 1021, 1022. 1183——The adulteration of bread, flour, cocoa, beer, &c. has been general and much the same in all samples, wherever procured, *ib.* 1033, 1034. 1047, 1048. 1062. 1143, 1144. 1147. 1155. 1156.

Belief that the evil of adulteration has been greatly exaggerated by the witnesses before the Committee, *Redwood* 1717——The cases of detected adulteration are few in proportion to the great number of traders under the supervision of the Excise, *Phillips* 2454——Witness concurs in the evidence of Mr. Redwood and Mr. Phillips, that the amount of adulteration existing, has been much exaggerated, *Wallington* 2516, 2517. 2550–2552.

Adulterations are more extensive than are admitted by Mr. Redwood, *Scanlan* 2875.

Preventive Measures. Suggested machinery for the prevention of adulteration; the remodelling of the detective and analytical departments of the Excise would effect the object required; *Hassall* 182——Belief that sophistications and adulterations cannot be stopped altogether, *Normandy* 186——Probability of any measure for the prevention of adulteration being less operative for a time in a small place than in large towns, *Simon* 796. 837——Mere commercial frauds, not injurious to health, do not require special legislation, *ib.* 800, 801.

Expediency of confining remedial measures to adulterations injurious to health or fraudulent to the public pocket, as distinct from innocuous or beneficial adulterations, *Wallington* 2538–2550. 2607–2611——The Treasury, or some other department of Government, should prohibit the importation or sale of those articles which they consider to be improperly adulterated, *ib.* 2610, 2611. 2619, 2620. 2622–2626——Grounds upon which injunctions, prohibiting the sale of adulterated articles, should be granted, *ib.* 2636–2649.

See also *America. Central Board. Education. Exposure. Fines. Foreign Countries. France. Imports. Imprisonment. Inspection. Interrogatories. "Lancet," The. Nuisances Removal Act.*

Prices. Increase of prices in some cases if genuine articles be sold, *Hassall* 299–303——Disproportionate increase in cost if purity be required, *Redwood* 1625. 1649. 1656.——Competition in price on the part of the public, adverted to as the main cause of adulteration, *ib.* 1646, 1647. 1699. 1722. 1736——Opinion that prices would not be higher if there were no adulterations, *Simmonds* 2090–2093——Different prices charged in different cases for the same drug, on account of the greater or less adulteration, *Postgate* 2742, 2743. 2746–2748——Many important drugs differ materially in price, *Letheby* 2793.

Prosecutions. Mode in which prosecutions should be conducted, *Hassall* 335–340——Difficulty in proceeding at law against druggists who profess untruly to get all their drugs from Apothecaries' Hall, *Warington* 496–499——Advantage if there were a public prosecutor and a system of fines, *Normandy* 571——Suggestion that there should be a power of proceeding vested in certain local authorities, *Simon* 793. 796. 800. 804. 834——Advantage of a public referee, before whom charges for selling impure goods might be brought, *Simmonds* 2084–2089.

Prussia. Enactments in the Prussian municipal law, with regard to the sale of spoilt or adulterated articles of food or drink, *Simmonds* 2061.

Prussian Blue. Prussian blue as used for colouring tea is not injurious to health, *Warington* 373.

Public, The. How far the public might be enabled of themselves to detect adulterations, *Hassall* 324, 325——Helplessness of the public in regard to adulterations, *Thomson* 1526. 1529, 1530.

Publicans. See *Beer.*

Publicity. See *Exposure.*

Punishments. Modes of punishment desirable to be inflicted upon the adulterator and the seller whenever adulteration is proved, *Hassall* 182; *Postgate* 2129–2134——Greater responsibility desirable in the actual adulterator than in the seller, *Hassall* 286–289——Opinion in favour of punishing those adulterations only which are prejudicial to health, *Simon* 798–802. 871, 872. *See* also *Fines. Imprisonment.*

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Quassia. Reduction of duty in the case of quassia adverted to, *Simmonds* 2068.

Quinine. Adulterations of this article as tested by witness, *Warington* 524. 529, 530——The Apothecarie's Company have sent enormous quantities of quinine to the Crimea; also to the East Indies; *ib.* 525——Substances with which quinine is adulterated, *Normandy* 779, 780——Fraudulent adulteration of quinine with salacine and quinidine, *Postgate* 2707–2709——Witness has never found quinine adulterated with Epsom salts, *ib.* 2754.

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Red Lead. Injurious effect of red lead upon the system, *Hassall* 33–36——Witness never discovered red lead in chocolate or cocoa powder, *Normandy* 611——Belief that red lead is not used in the trade for colouring pickles or sauces, &c., *Blackwell* 1588, 1589. *See* also *Cayenne Pepper.*

Redwood, Theophilus, PH. D. (Analysis of his Evidence.)—Has been Professor of Chemistry and Pharmacy to the Pharmaceutical Society for the last fourteen years, and for the greater part of that time curator of the society's museum, 1618, 1619——Has had very considerable experience in regard to the composition and adulteration of drugs, 1619. 1626–1630——The Pharmaceutical Society numbers about 3,000 members, and has promoted in every way the suppression of adulteration, 1619.

Clear distinction desirable to be drawn between impurity and adulteration, inasmuch as many drugs and chemical products may be impure, and sometimes are necessarily so, without being adulterated, 1620——Explanation relative to cyanide of potassium, as used in electro-plating, to the effect that it is not pure, because there is a greater demand for it in an impure and cheap state, 1620–1624—— Greater purity than formerly in iodide of potassium and other substances required in photography, on account of such purity being necessary, 1620. 1622, 1623——Facility for procuring good drugs in London or any part of the country, 1625.

Evidence showing that any slight impurity in carbonate of soda should not be considered an adulteration; sufficient purity of this substance, as generally obtainable, for all the purposes required of it; 1625. 1631–1634. 1637–1642. 1649–1654——Sundry other articles adverted to as being met with in commerce, sufficiently pure for the purposes for which they are required, 1625. 1631–1634——Disproportionate increase in cost if purity be required, 1625. 1649. 1656——Statement that carbonate of potash should not be considered adulterated because chloride of potassium is mixed with it, 1634–1636.

The result of witness's experience shows that many drugs are adulterated, but that there is less adulteration than formerly, 1643–1645——Improved education is the best mode of checking adulterations, 1645, 1646——Competition in prices tends to lower the quality of drugs, 1646, 1647——Difference naturally in the quality of drugs, 1648——Enhancement in the price of rhubarb, jalap, &c. through qualities of an extrinsic nature being too much considered, 1649. 1656, 1657——As regards the use of adulterated drugs in making up the prescriptions, the evil is much less than has been represented; the great majority of drugs being used irrespectively of prescriptions; 1654–1656.

Witness admits that adulterations and frauds are practised in certain cases, but considers the statements on the subject have been greatly exaggerated, 1658-1661——With respect to milk of sulphur witness considers, for certain assigned reasons, that the mixture of sulphate of lime therewith is merely a conventional adulteration, 1662–1671——Many adulterations are the result of conventionalities between the manufacturer, the retailer, and the public, 1665.

[Second Examination.]—Further evidence as to the purity of several chemical products before referred to, 1672 *et seq.*——Distinction between carbonate of soda and bi-carbonate of soda, 1672——Bi-carbonate of soda, or, as it is popularly termed, carbonate of soda, is almost invariably sold by chemists in a pure state; out of 40 samples recently tested by witness there was no appreciable amount of impurity in any one of them; how the samples were procured, 1675-1687——Circumstance of a sample of bi-carbonate of soda, brought to witness by Dr. Normandy, having contained twelve per cent. of sulphate of soda, 1676. 1681.

The examination by witness of fifty-one samples of calomel shows that it is sold by the dealers in a state of great purity; mode in which these samples were obtained, 1687–1693——Grounds for the statement that iodine is not adulterated either with water or black-lead, 1693-1697——The retail dealers of drugs are as a body strongly opposed to adulteration, and not only do not practise it but expose and check it to a considerable extent, 1697–1701. 1710, 1711. 1808, 1809——Competition in price, on the part of the public, adverted to as the main cause of adulteration, 1699. 1722. 1736.

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The greatest amount of adulteration in drugs is practised probably by the drug-grinder; explanation hereon; 1700–1704. 1710——Cause of the use of sawdust in the adulteration of drugs, 1704——Cognizance of the wholesale druggist in regard to adulteration by the drug-grinder, 1705——Different price for the drug in its crude state, and in its powdered state, adverted to as indirectly another cause of adulteration, 1706–1708. 1714, 1715——The practice of adulteration, though very general till recently, is, to a great extent, falling into disuse, 1706. 1709.

In some instances the wholesale druggists grind their own drugs, 1709. 1712, 1713——Retail dealers do not always use the full amount of spirit in case of tinctures, 1710. 1716——Further statement that the evil of adulteration has been greatly exaggerated by the witnesses before the Committee, 1717——Practice of some physicians to recommend their prescriptions to be made up at particular shops; reason for their doing so; 1718–1723. 1738–1743——Great disparity naturally in the quality of the generality of drugs, 1720, 1721——Inferior or adulterated drugs are, generally speaking, confined to the poorer neighbourhoods, 1722. 1746–1749.

With regard to cod-liver oil, witness does not believe it is extensively adulterated, 1724——Nor does he believe that there is much adulteration in sarsaparilla, 1725–1727——Experience of witness for thirty years in the practice of chemistry and pharmacy, and for the last fourteen years of that period as an analytical chemist, 1728, 1729. 1744, 1745——Sale of damaged or naturally inferior drugs by some chemists, 1730–1732——Means by which chemists judge of the quality of the drugs supplied to them for retail sale, 1732, 1733. 1816–1819——Some druggists justify the sale of inferior drugs on the ground that the price given for them does not admit of their supplying a better article, 1734–1737.

Witness never found magnesia to contain lime or any other ingredient as introduced for adulteration, 1749–1752——There is no difficulty in getting good magnesia, 1753——Definition of the distinction between adulterations and impurities, 1754–1759——Definition of conventional adulterations as distinct from fraudulent adulterations, 1759. 1820–1829. 1832——Non-repetition of fraudulent adulterations after they have been once detected, 1759–1765. 1796. 1803, 1804——Enumeration of the several cases of fraudulent adulteration of drugs which have been brought to light during the last fourteen years, and which have been exposed in the Journal published by the Pharmaceutical Society, 1761–1768. 1797–1799.

Extent of adulteration by the use of gelatine in the case of some isinglass examined by witness in 1850; use of gelatine partly defended; 1765–1777——Opinion that lard manufactured in England is not adulterated, 1786–1788——Competition in business adverted to as a most useful check upon adulteration, 1788–1796——The quality of drugs has decidedly improved of late years, and is still improving; causes to which owing, 1800–1808——Importation of more pure Alexandrian senna through means of the retail druggists, 1808——Also through their instrumentality of a purer quality of scammony, 1808, 1809.

Opium, scammony, senna, &c., are adulterated before importation, 1808, 1809——Heterogeneous character of opium in its imported state, 1809. 1819——Turkey opium is purer and better than Indian opium, 1810–1813——Belief that opium is never adulterated in this country, 1814, 1815——Harmless character of bole Armenian as used for colouring anchovies, &c., 1821. 1824. 1831, 1832——Use of copper to colour pickles adverted to as being practised partly in ignorance as to its injurious effect, 1824–1826——Reference to the attempt by the French government to suppress the practice of mixing sulphate of copper with bread, 1826–1828.

Explanation in regard to the substitution of sulphate of baryta for calamine, 1829, 1830——Substance used as Armenian bole, there being now no real Armenian bole imported into this country, 1830–1832——Explanation as to the mixture of sulphate of lime with milk of sulphur; conventional character of this adulteration, 1832. 1834–1836——Reason why the oxide of zinc sold generally by chemists is not a pure product; respect in which this adulteration is of a conventional nature; 1832, 1833.

Evidence in explanation of the adulteration, or rather the dilution of gin by the publican; defence of the same as being done to suit the public taste, as not being injurious to health, and as being the means whereby the publican obtains his profit, and is enabled to conceal such profit from the public, 1836 *et seq.*——Grounds upon which the dilution of beer by the publican may be justified, 1840 *et seq.*——Opinion that beer is more largely adulterated than gin, and that substances prejudicial to health are frequently introduced into it, 1882–1886. 1893.

Vague nature of statements made to the Committee in regard to the adulteration of gin, 1884–1886. 1928——Extent to which oil of almonds and oil of vitriol are used for the production of artificial strength; this practice is termed "beading," and is in exceptional cases only carried to an extent injurious to health, 1899–1901. 1909–1913. 1924–1934——Doubt as to the disclosures before the Committee leading to the sale of gin in a less adulterated state, 1908.

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Rare use of Cayenne pepper as an ingredient in the adulteration of gin, 1914, 1915——Opinion as to sulphate of iron not being used to an injurious degree in porter; object of its use, 1918–1923——Witness does not consider "beading" an adulteration, 1929–1932——Scarcely appreciable difference of taste between gin as sold by the distiller and by the publican, 1935–1937.

The Pharmaceutical Society has been established between fourteen and fifteen years, 1938——Its object was the improvement of pharmacy, and the better supply of drugs, 1939. 1943——It comprises among its members nearly all the leading people of the country engaged in the trade of vending drugs, 1940–1942.

Revenue, The. Anticipated considerable saving to the revenue by the prevention of adulteration, *Hassall* 182–185——With respect to the effect of adulteration in a fiscal point of view, witness calculates that on certain enumerated articles there is at the lowest computation a loss of more than three millions a year to the revenue, *Simmonds* 2039–2050.

See also *Beer,* 6. *Cinnamon. Cocoa. Coffee,* III. *Nutmegs. Spirits. Sugar. Tea,* 5. *Tobacco. Wines.*

Rhubarb. Yearly sale of a large quantity of English grown rhubarb to wholesale druggists, *Warington* 487–489; *Herring* 2017——Medicinal effect of English rhubarb, *Warington* 490, 491——Difference between Turkey rhubarb and Russian rhubarb, properly so called, *ib.* 492–495——Frequent adulteration of rhubarb with flour and turmeric, *Thomson* 1492, 1493——Enhancement of the price of rhubarb, jalap, &c., through qualities of an extrinsic nature being too much considered, *Redwood* 1649. 1656, 1657.

Rum. Dilution and adulteration in the case of nineteen samples of rum; use of water and Cayenne pepper; *Hassall* 5. 93.

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Salt Provisions. Expediency of a check with regard to the importation of salt provisions, *Simmonds* 2093.

Samples Analysed. Means by which the samples for witness's analyses were procured; great care taken on this point; *Hassall* 10–15——Explanation as to the manner in which the samples of drugs found by witness to be extensively adulterated were obtained, *Thomson* 1533–1550. 1555–1558——Effect of the present inquiry in leading to the sale of purer drugs if suspected to be required for the purpose of analysis, *Normandy* 1949——Practice of the Board of Inland Revenue in regard to the selection of articles for examination, *Phillips* 2150. 2162, 2163——The samples referred to in witness's evidence were suspected to be adulterated, *ib.* 2150. 2160. 2492, 2493——Samples of tea, &c., have been supplied to Dr. Hassall by the Board of Inland Revenue, *ib.* 2432.

Sarsaparilla. Witness does not believe that there is much adulteration in sarsaparilla, *Redwood,* 1725–1727——Doubts as to the extract of sarsaparilla being adulterated, *Letheby* 2809–2813.

Sauces. Results of the examination of thirty-three samples of sauces; use of bole Armenian for colouring, *Hassall* 5. 15. 57——Injurious adulteration of sauces, &c., with ferruginous earths, *Letheby* 2768.——*See* also *Anchovies. Bole Armenian.*

Sausages. Impression as to horses' tongues and horse-flesh being used in making sausages, *Thomson* 1293–1296——Inferior and injurious meat of which sausages are made, *Simmonds* 2095.

Scammony. Different substances with which scammony is adulterated, *Hassall* 5——Conclusions deducible from the examination of thirty specimens; one sample only was genuine, *ib.* 146——Importance of the drug scammony; purposes for which used; *Hassall* 148; *Warington* 450; *Herring* 1955. 1964——There is considerable adulteration in scammony, and great variety in the price, *Warington* 449.

Scammony from its high price is adulterated both here and abroad, *Sir J. Gordon* 993–995——Adulteration in several specimens of scammony examined by witness; how the samples were procured, *Thomson* 1487. 1555–1558——Importation of a purer quality of scammony through the instrumentality of chemists and druggists, *Redwood* 1808, 1809——Mode of collection of scammony; necessary use of some absorbent substance, *Redwood* 1809; *Herring* 1967.

Public sale recently of a spurious article imported as scammony, *Herring* 1953–1960——Very great difficulty in procuring unadulterated scammony, there being frequently a large ingredient of chalk, *ib.* 1960–1964. 1967, 1968——Instances of extensive and fraudulent adulteration of scammony with chalk and starch, *Postgate* 2716, 2717——Adulteration of scammony adverted to as taking place abroad, and as being to a certain extent necessary, *Letheby* 2779–2781.

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Scanlan, Maurice. (Analysis of his Evidence.)—Considerable experience of witness in regard to the manufacture of chemicals, 2850–2854——Instances of adulteration of bread and flour at Wolverhampton, &c., with alum, 2855–2859——Experience of witness as a licensed rectifier, 2860–2862——Unnecessary deterioration in the quality of gin by the adulteration said to be practised by the retailer, 2862. 2865–2868——Reduction by the rectifier in the strength of spirit as supplied to him by the distiller, 2863–2865——Adulteration of soluble Cayenne with copper and vermilion, 2869.

Distinction drawn between accidental impurities and intentional adulterations, 2870. 2872——Adulterations detected by witness in certain drugs, and in chemicals used in medicine, 2870–2874——Adulterations are more extensive than was admitted by Mr. Redwood, 2875——Doubt as to there being a compulsory examination of each member of the Pharmaceutical Society, 2875, 2876——Bi-carbonate of soda is rarely adulterated, 2876——Soda, as used for washing, &c., has been much adulterated, 2876, 2877.

Pure quality of the drugs sold at many of the drug houses and chemists' shops in London, 2877——The introduction of foreign matter is not necessary in powdering opium, 2879——The same remark applies to nux vomica, *ib.*——Though a system of inspection would prevent much adulteration, witness looks upon the better education of chemists and druggists, and of the public, as the principal check, 2880.

Senna. Importation of more pure Alexandrian senna through means of the retail druggists, *Redwood* 1808——Mixture of argell leaves with senna leaves, *Postgate* 2741.

Simmonds, Peter L. (Analysis of his Evidence.)—Author of a work upon the Commercial Products of the Vegetable Kingdom, 2037, 2038——Can speak more especially to adulterations in articles as imported into this country, 2039. 2060——With respect to the effect of adulteration in a fiscal point of view, witness calculates that, on certain enumerated articles, there is, at the lowest computation, a loss of more than 3,000,000 *l.* a year to the revenue, 2039–2050——Non-concurrence in Mr. Redwood's statement, that the retail dealer of gin made his profit by adulteration, and that the practice was necessary as a means of concealing his profit, 2041.

Frequent substitution of cassia for cinnamon adverted to; the former pays a duty of only 1 *d.* per pound, while the latter pays 2 *d.*; 2050–2055——Complaint in regard to the importation of wild nutmegs at a duty of 5 *d.* per pound, while 1 *s.* per pound is charged in the case of cultivated nutmegs; the former nutmegs are constantly sold as the true spice; 2055–2058——Use occasionally of wild mace for adulterating the true mace, 2058——Mode of adulteration of black pepper, *ib.*——Also of white pepper, *ib.*——Cayenne pepper is seldom imported in a ground state, but is extensively adulterated in this country, 2059.

State of the law in foreign countries, with a view to the prevention of adulterations, 2061——Inadequacy of the Excise regulations in regard to the importation of spurious articles, *ib.*——Suggested appointment of thoroughly competent officers at each of the principal ports, who should examine and report upon the quality of all imported articles, *ib.*——Particulars as to the provisions and operation of the American Act of 1848, for preventing the importation of adulterated and spurious drugs and medicines; beneficial results thereof; papers delivered in, in illustration; 2061–2063, & *p.* 43, 44.

Statement as to the consumption of malt and hops in this country continuing stationary, though the consumption and exportation of beer must have increased considerably; inference therefrom; 2063–2066——Sundry deleterious ingredients used for the adulteration of beer, 2067–2073——Reduction of duty in the case of quassia adverted to, 2068——Also in the case of coculus Indicus, *ib.*——Increased price of coculus Indicus, 2072——Increase of late in the consumption of opium in this county, 2073–2080——Opinion as to Indian opium being imported, and being equal to Turkish opium, 2078, 2079——Increased use of opium in America adverted to, 2080.

The Apothecaries' Company used to have authority to inspect druggists' shops, 2081——Power, rarely exercised, of the College of Physicians to inspect druggists' shops, and to confiscate impure or adulterated articles, 2081, 2082——Frequent clearance sales at the Docks of damaged goods, which are probably used in adulteration, 2083——Advantage of a public referee, before whom charges for selling impure goods might be brought, 2084–2089——A good deal of the adulteration is done abroad, 2089.

Opinion, that prices would not be higher if there were no adulterations, 2090–2093——Expediency of a check upon the importation of damaged or adulterated corn from America, 2093——Also with regard to salt provisions, *ib.*——Also with regard to lard, 2093, 2094——Remarks upon the very bad quality of the milk sold in London, &c., 2094, 2095——Inferior and injurious meat of which sausages are made, 2095——Extensive adulteration in the case of oils of different kinds; the ingredients in some instances, as in that of salad oil, being very prejudicial to health, 2095–2097.

Simon, John. (Analysis of his Evidence.)—Officer of Health for the City of London, 788——Is not prepared to testify to the details of adulterations, 790, 791 838–842——Considers the adulterations, which are practised, to be undoubtedly injurious to health, 792——Suggestion, that any persons suffering by adulteration, should have a remedy by summary

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summary proceedings before a magistrate, 793. 834——Suggestion, that there should also be a power of proceeding vested in certain local authorities, 793. 796. 800. 804. 834.

Obstacle to local boards of health being the parties to take cognizance of adulterations, 794. 820——Suggestions for using the instrumentality of the local inspectors to be appointed under the Nuisances Removal Act, 794–796. 820. 823–827——Great importance of publicity in the case of any adulteration, 794. 853——Considerations with respect to the person who should undertake the analysis of articles; suitableness and competency for this purpose of the local public health officer, or still more so, the Poor Law medical officer, 795. 797. 814–822. 846–867. 873–876——Probability of any measure for the prevention of adulteration being less operative for a time in small places than in large towns, 796. 837.

Opinion in favour of punishing those adulterations only which are prejudicial to health, 798–802. 871, 872——Mere commercial frauds not injurious to health do not require special legislation, 800, 801——Suggested publication, by some central authority, of schedules of those adulterations to be proceeded against by the local authorities as hurtful to health, 803. 870——The Board of Health, advised by proper medical authorities, would be the most suitable body to decide what are the adulterations to be proceeded against, 803. 806–808. 829–833. 843–845.

Spurious article sold in lieu of calamine, 809, 810——Instance of the use of Venetian red in pickled anchovies, 811——Extensive adulteration of bread with alum, 811–813——Opinion that such adulteration should be proceeded against as injurious to health, 828, 829——The Act 6 & 7 Will. 4, c. 37, with regard to the adulteration of flour, is nearly inoperative, 835, 836——Great importance of checking the great and varied amount of adulteration in drugs, the same now leading to the uncertainty of pharmaceutical preparations, 837–842——Objection to the central authority having generally to undertake the analyses of all suspected articles, as proposed by Dr. Hassall, 868–870.

Snuff. Various substances with which snuff of different kinds is adulterated, *Hassall* 5. 15; *Phillips* 2398–2400——Injury to health from the adulteration of snuff with a preparation of lead; instance of this, *Hassall* 33. 36. 149——Extensive and deleterious adulteration of various kinds of snuff, as shown by the examination of forty-three samples, *ib.* 61. 65.

In 11¾ years there have been 1,036 samples of snuff, as examined by witness, adulterated, the parties being prosecuted in every case, *Phillips* 2401, 2402——Peat or fustic, as mixed with snuff, is not injurious to health, *ib.* 2403–2409——Poisonous properties of certain substances with which snuff is adulterated, *Letheby* 2768.

Soap. When soap was subject to the Excise adulteration was not largely resorted to, *Phillips* 2329–2332——Adulteration involved in the manufacture of soap according to the patent taken out by Dr. Normandy, *ib.* 2333, 2334——Explanation with reference to the patent taken out by witness for the introduction of a certain quantity of sulphate of soda into soap; the use of sulphate of soda is a great advantage, and cannot be termed an adulteration, *Normandy* 2502–2511.

Soda. Soda, as used for washing, &c., has been much adulterated, *Scanlan* 2876, 2877.
See also *Carbonate of Soda.*

Spices. Different substances with which mixed spices are adulterated, *Hassall* 5——Adulteration of sixteen samples of mixed spice out of twenty-six samples examined by witness, *ib.* 32.

Spirits. In the case of all spirits, adulteration is practised by the addition of water, and then of certain substances, to give a fictitious strength in lieu of that displaced by the dilution, *Normandy* 752, 753——Calculated loss of 466,833 *l.* a year to the revenue by the adulteration of British spirits, *Simmonds* 2047——Calculated loss of 250,000 *l.* on foreign spirits, *ib.* 2050——Reference to the evidence before a former Committee of the House, as having been opposed to any interference with the adulteration of spirits, *Wallington* 2680, 2681——Reduction by the rectifier in the strength of spirits as supplied to him by the distiller, *Scanlan* 2863–2865.

See also *Gin.* *Rum.*

Spirits of Nitre. Witness has found spirits of nitre much diluted with water, *Postgate* 2720.

Spirits of Rosemary. Great difference in the component parts and the price of spirits of rosemary as used in gin and in its genuine state, *Postgate* 2749–2752.

Stout or Porter. See *Beer.*

Strychnine. See *Nux Vomica.*

Sublimates. Memorandum by Mr. Warington, as submitted to the Chemical Society in 1852, upon the process of sublimation in a straight tube, *App. p.* 138.

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Substances used for Adulteration. Table showing the injurious substances employed for adulteration, as detected by witness, and showing also the articles in which they were found, *Hassall* 150.

Sugar. Witness finds that sugar is but rarely adulterated; matters mixed with it, *Hassall* 5——Sand and plaster are stated to be used, *ib.* 15——Considerable extent to which brown sugar is adulterated with various substances, as shown by the analysis of thirty-six samples by witness, *ib.* 16——Less extent of adulteration in the case of fifteen samples of lump sugar, *ib.*——Detection by witness of lime in sugar refined in England, *Thomson* 1269-1276——Calculation that there is upwards of half a million loss to the revenue by the adulteration of sugar, *Simmonds* 2040. 2042——Adulteration of sugar with potatoes, *Letheby* 2757, 2758. 2773.

Sugar Confectionery. See *Coloured Confectionery.*

Sulphate of Baryta. See *Calamine.*

Sulphate of Iron. See *Beer*, 3.

Sulphate of Soda. See *Carbonate of Soda.*

Sulphates of Quinine. Adulteration of sulphates of quinine in France, but not in this country, *Letheby* 2781, 2782.

Summary Proceedings. Suggestion that any person suffering by adulteration should have a remedy by summary proceedings before a magistrate, *Simon* 793. 834.

T.

Tamarinds. Witness has found tamarinds acidified with sulphuric acid, *Postgate* 2709, 2710.

Tartar Emetic. Free cream of tartar has been detected by witness in tartar emetic, *Postgate*, 2739-2741.

Tartaric Acid. Witness has found thirty per cent. of alum in tartaric acid, *Postgate* 2739.

Tartarized Soda. Mixture of sulphate of potash with tartarized soda, *Postgate* 2720.

Tea:

1. *Generally as to Black and Green Teas.*
2. *Colouring Substances employed.*
3. *Adulteration with "Lie" Tea.*
4. *Supervision exercised by the Board of Inland Revenue.*
5. *Loss to the Revenue by the Adulteration.*
6. *Papers delivered in by Mr. Warington.*

1. *Generally as to Black and Green Teas:*

Detailed statement as to the adulteration of black and green tea, both in its imported state and as purchased from dealers in this country, *Hassall* 5. 23-31——Substances found in tea as imported, *ib.* 23. 25.; *Phillips* 2346——Invariable adulteration in the case of green tea imported from China; lie tea and other ingredients being used to an excessive degree, *Hassall* 23. 27-29——The souchongs and congous arrive from China in a genuine state, *ib.* 23. 27——Extent and character of the adulteration in this country, *Hassall* 29-31; *Phillips* 2346——Course adopted so as to prevent detection, when plum or sloe leaves are mixed with tea, *Hassall* 29-31.

The adulteration of tea mainly takes place abroad, *Warington* 422. 430-432——Instance of the fabrication of tea in this country, *ib.* 423. 438——Principal adulterations discovered by witness in green tea, *Normandy* 574, 575. 577-582——Statement showing that persons buying chests of tea are not secure from fraud by the wholesale dealer, *ib.* 575-577——Instances of the mixture of magnesia with tea, *ib.* 575-578——Witness can vouch for the adulteration of tea by the wholesale dealer, but cannot speak to the practice of the retail dealer, *ib.* 586, 587——Nutritious property in tea, *ib.* 674.

Witness has, in several instances, found tea adulterated with sloe and hawthorn leaves; the sloe leaf is quite innocuous, *Mitchell* 1157-1167. 1171. 1178——Belief as to parties procuring exhausted tea leaves from hotels, &c., and preparing them for sale as genuine tea, *ib.* 1172-1177. 1179——Instance of the adulteration of tea with iron filings, the same being occasionally practised by the Chinese, but not in this country, *Thomson* 1242-1268——Case of adulteration to the extent of forty-nine per cent. in tea as imported; gum was the chief ingredient used, *Phillips* 2358-2362. 2366——Slight proportion of adulteration as regards weight, in comparison to the whole amount of tea imported, *ib.* 2370, 2371. 2380.

2. *Colouring*

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Tea—continued.

2. *Colouring Substances employed:*

Different colouring matters used in the case of black tea and green tea, *Hassall* 23. 27 ——More injurious colouring substances used in this country than in China, *ib.* 29 ——Artificial colouring of green tea adverted to as a constant practice, *ib.* 304. 308–315.

Particulars relative to the glazing of green tea before it comes to this country; substances used for the purpose, *Warington* 358, 359. 365–378——Nature of unglazed tea as imported, and as sold by the wholesale dealers, *ib.* 359–364——The glazing of tea is done for the purpose of making it more attractive to the eye; how far it is injurious to health, *ib.* 366. 371–377 —— Green and black teas are often made from the same plant, the difference between them arising from the different modes of drying, *ib.* 368–370——All the samples examined by witness were procured from wholesale dealers, *ib.* 426–428.

Earthy matter is contained in the facing of the tea, *Mitchell* 1168, 1169——Instance of the adulteration of a quantity of black tea with Prussian blue, so as to render it saleable as green tea, *Thomson* 1232–1242——The only injurious substances found by witness were carbonate of copper and Prussian blue, *Phillips* 2372–2379.

3. *Adulteration with "Lie" Tea:*

Considerable extent to which lie tea is substituted for the genuine article; character of lie tea, *Hassall* 23. 27, 28——Lie tea contains from forty to fifty per cent. of earthy matter, and is not a tea plant at all, *Warington* 379, 380. 388–392——It is sold by the Chinese to the English merchant for the purpose of adulteration, *ib.* 380–387. 417–420. 433——Admission of lie tea into this country on payment of the usual duty, *ib.* 385. 394–396. 421. 434–437.

Quantity of lie tea now imported; larger quantity at one time, *Warington* 385. 393 402 ——Fraud upon the poorer classes by the sale of lie tea for real tea, *ib.* 403–405. 408, 409——Means for detecting lie tea, *ib.* 406, 407——Lie tea or adulterated tea, though made in China, is never used by the Chinese, *ib.* 410–416.

4. *Supervision exercised by the Board of Inland Revenue:*

Evidence showing the extent and character of the adulterations of tea, and the steps taken by the Board of Inland Revenue to prevent the same, *Phillips* 2345–2381. 2392–2394——Instance in the case of a mixture of carbonate of copper in tea, of a penalty of ten pounds for every pound of tea found on the premises, *ib.* 2348–2351—— Stop put to the manufacture of spurious tea in this country, *ib.* 2352–2357. 2364, 2365 —— Explanation as to the limited number of tea samples sent up to the Board for analysis, *ib.* 2392, 2393.

5. *Loss to the Revenue by the Adulteration:*

Calculated loss of 23,500 *l.* a year to the revenue by the adulteration of tea, *Simmonds* 2043–2046.

6. *Papers delivered in by Mr. Warington:*

Observations by Mr. Warington in 1844, as extracted from the "Memoirs of the Chemical Society," upon the green teas of commerce, and the adulterations and colourings employed therein, *App. p.* 129–132 ——Further remarks as submitted to the society in 1851, on black and green teas, and the adulteration and colouring thereof, *ib.* 132–136——Further observations by Mr. Warington, as submitted to the society in 1852, upon the green teas of commerce, and the colouring and other matters used in the preparation of the same, *ib.* 137, 138.

See also *Assam Tea.* *China Clay.* *Veno Beno.*

Thames Water. See *Water Supply.*

Thomas's, St., Hospital. Witness is professor of chemistry at St. Thomas's Hospital, *Thomson* 1184——Practice at the hospital to submit every drug to examination, and to reject those which are impure, *ib.* 1459. 1462——One-third of the drugs examined by witness have been rejected, *ib.* 1463 ——The drugs for the hospital are ordered by a standing drug committee from different druggists; reason for not obtaining them from Apothecaries' Hall as a better source of supply, *ib.* 1464–1473. 1505. 1533–1548. 1553–1557——List of several drugs supplied to the hospital within the last eighteen months which witness has found to be adulterated, with a statement of the adulterations in each case, *ib.* 1506–1510.

Thomson, Robert Dundas, M.D., F.R.S., L. and *E.* (Analysis of his Evidence.)—Professor of chemistry at St. Thomas's Hospital, 1184——Has turned his attention to the adulteration chiefly of drugs, 1185, 1186——With regard to flour, has found the adulteration to consist mainly of the introduction of inferior flour, 1187–1189. 1196——Has found alum in bread, and knows it to be manufactured for the purpose, 1190. 1196–1198——

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Thomson, Robert Dundas, M.D., F.R.S., L. and *E.* (Analysis of his Evidence)—*continued.*

Has also found bicarbonate of soda in bread; explanation as to this adulteration, 1190-1195——Injury to health consequent on the use of alum in bread, 1199, 1200.

Instance of extensive adulteration of oatmeal, 1200, 1201——Fraudulent adulteration of arrowroot with potato-starch, 1201, 1202——Adulteration of mustard with turmeric and various sorts of pepper, 1203, 1204——Reference to substances made from inferior foreign wheat, 1204-1207——Varying proportions of chicory detected by witness in coffee, the adulteration being greater in the poorer localities, 1207-1212——Instance of an attempt to adulterate coffee with lupines, 1212——Statement as to witness having seen imitation coffee berries produced by a patented machine for the purpose; fraud on the public hereby, 1213-1232.

Instance of the adulteration of a quantity of black tea with Prussian blue, so as to render it saleable as green tea, 1232-1242——Ingredients of which "la veno beno" (as formerly made in this country for the adulteration of tea) was composed, 1242-1244——Instance of the adulteration of tea with iron filings, the same being occasionally practised by the Chinese, but not in this country, 1242-1268.

Detection by witness of lime in sugar refined in England, 1269-1276——Injurious adulteration of sweetmeats and comfits with terra alba or plaster of Paris, 1276-1278——Substance consisting chiefly of the oil of grain with which sweetmeats and comfits are flavoured, 1278-1292——Impression as to horses' tongues and horse-flesh being used in making sausages, 1293-1296——Greater absorption of water by good bread than by inferior bread, 1297-1299.

Inferiority of the water supplied to London to that supplied to other towns in the country; diagram delivered in illustration, 1300, and *App. p.* 138——Reference to and explanation upon other diagrams (*App. p.* 138), representing the different degrees of impurities and of hardness in the water supplied to London by the different companies, 1300-1302——Increasing impurity as the river is descended from Thames Ditton, 1301, 1302——Reference to another diagram (*App. p.* 138), representing the condition of the river at high water and at low water, 1302——The influence of the salt water varies a good deal at different times, 1303.

[Second Examination.]—Further evidence in detail with reference to the impurities and general condition of the water supply of London, 1304 *et seq.*——Removal by filtration (which will soon be imperative on all the companies) of all mechanical impurities, but not of organic or inorganic impurities, 1332-1334. 1393-1399. 1445-1449——Tabular statement of the actual composition of the water supplied by the several companies, 1352——Sundry means by which the supply may be improved, 1370-1385. 1400-1405. 1417. 1432-1455——Injurious effect of the water upon the public health generally, cholera moreover being aggravated thereby, 1406-1414. 1430, 1431.

With regard to drugs the practice of adulteration is very general, and is most injurious, 1456-1458. 1470-1471. 1526-1532. 1552——Adulteration of white precipitate of mercury with chalk, 1459-1461——Practice at St. Thomas's Hospital to submit every drug to examination, and to reject those which are impure, 1459. 1462——One-third of the drugs examined by witness have been rejected, 1463——The drugs for the hospital are ordered by a standing drug committee from different druggists; reason for not obtaining them from Apothecaries' Hall as a better source of supply, 1464-1473. 1505. 1533-1548. 1553-1557.

The practice of adulteration is just as bad as in 1838, when the attention of the Legislature was drawn to the matter, 1474-1477——Inferior quality of the drugs supplied in the cases of paupers, 1478, 1479——Circumstance of a certain druggist being willing to supply any powder at 36*s.* the cwt., 1480-1484——Sometimes the article does not contain any of the substance by the name of which it is called, 1485——Instance of excessive adulteration of opium, 1486, 1487——Adulteration in several samples of scammony examined by witness; how the samples were procured, 1487. 1555-1558.

Distinction drawn between adulterations and impurities in drugs, 1488, 1489——Frequent adulteration of rhubarb with flour and turmeric, 1492, 1493——Belief as to the purity of the East India opium when it leaves the Company's factories, 1494-1504——List of several drugs supplied to St. Thomas's Hospital within the last eighteen months, which witness has found to be adulterated, with a statement of the adulterations in each case, 1506-1510——Constant complaints by medical men in regard to the way in which their prescriptions are made up, 1512-1515. 1552.

Expediency of a system of public inspection as a check upon adulteration, 1516-1532——Approval of inspection upon the principle of that under the Excise, with a means of reference, in cases of difficulty, to the most competent analysts, 1521-1525. 1559——Helplessness of the public in regard to adulterations, 1526. 1529, 1530——Explanation as to the manner in which the samples of drugs found by witness to be extensively adulterated were obtained, 1533-1550, 1555-1558——Local inspectors as proposed, should be medical men, 1559——They should act in concert with a central body of medical authorities, who might be connected with the Board of Health, *ib.*

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Tinctures. Retail chemists and druggists do not always use the full amount of spirit in case of tinctures, *Redwood* 1710. 1716.

Tobacco. Results obtained from chemical and microscopical analysis of different descriptions of tobacco, *Hassall* 5. 15. 61——Peculiarities in the structure of the tobacco leaf, *ib.* 61——The more common adulterations consist in the addition of water, sugar and salts, *ib.*——Loss of at least 23,000*l.* a year to the revenue by the adulteration of tobacco, *Simmonds* 2045, 2047.

Explanation as to the adulterations in some samples of tobacco submitted to the Excise some years since not having been fully detected, *Phillips* 2382–2385—— Matters which have been employed in the adulteration of tobacco, *ib.* 2415——The partial adulteration of tobacco was at one time allowed by law, *ib.* 2415, 2416——Water is now allowed to be mixed with tobacco, *ib.* 2416, 2417——Witness considers the tobacco trade to be at present quite free from adulteration, *ib.* 2417, 2418. 2448. 2494–2499——Difficulty in the examination of tobacco, *ib.* 2442. 2445.

Tonics. Extensive adulterations discovered by witness in tonics, *Thomson* 1507.

Trade. In trade, generally, the most respectable houses are least suspected of adulteration, *Blackwell* 1616, 1617——Evidence in favour of its being left entirely to the trade itself to prohibit injurious or fraudulent adulterations; the evil would work its own remedy, *Wallington* 2611 *et seq.*——*See* also *Competition. Prices.*

Treatises on Adulteration. Suggested publication of cheap treatises on adulteration, *Hassall* 182. 324.

Turmeric. See *Mustard.*

U.

Unfermented Bread. Strong objection to unfermented bread, in the manufacture of which muriatic acid and bicarbonate of soda are used, much to the prejudice of health, *Normandy* 589–595——Injury to health by the use of muriatic acid, *Scanlan* 2870, 2871.

United States. See *America.*

V.

Valerianates. Fraud, some years ago, as regards the valerianates of zinc, iron and quinine; exposure and suppression of such fraud, *Redwood* 1765.

Veno Beno. Ingredients composing the substance " la veno beno," as used for the adulteration of tea, *Normandy* 579–582. 585; *Thomson* 1242. 1244; *Phillips* 2422——Importation of this substance in 1849; it was at once suppressed by the Board of Inland Revenue, *Phillips* 2422, 2423.

Vinegar. Different matters used in the adulteration of Vinegar, *Hassall* 5. 15——Conclusions deduced from the examination of several samples; injurious adulteration practised more especially by the manufacturers, *ib.* 31——Further reference to the adulteration of vinegar; use of sulphuric acid adverted to, *ib.* 156–161. 164——Opinion as to vinegar having been but slightly adulterated when it paid duty, and came under the supervision of the Excise, *Phillips* 2300, 2301——Vinegar is largely adulterated with sulphuric acid, *Letheby* 2768.

W.

Wallington, Richard Arthur. (Analysis of his Evidence.)—Solicitor at Leamington; chairman of the Board of Health there, 2512–2514——Concurs in the evidence of Mr. Redwood and Mr. Phillips that the amount of adulteration existing has been much exaggerated, 2516, 2517——Argument in approval of innocuous or beneficial mixtures of substitutions as distinct from injurious adulterations; competition and reduction of prices resulting from such mixtures, 2517–2609——Justification of the mixture of chicory and coffee, as a benefit rather than an injury to the public, 2520–2532——Statement that there is no real standard of the value of coffee, 2520. 2575–2581.

Inexpediency of interfering with the principle of competition, the same being in the main a sufficient protection against fraudulent adulterations, 2521, 2522. 2529–2538. 2574. 2609——Expediency of confining remedial measures to adulterations injurious to health or fraudulent to the public pocket, as distinct from innocuous and beneficial adulterations, 2538–2550. 2607–2611—— Grounds for the argument that the substitution and sale of gelatine for isinglass is perfectly justifiable, 2555–2574. 2582–2606——Particulars relative to a patent with which witness is connected for the substitution of gelatine for isinglass; justification of the substitution; benefit to the public thereby, 2555–2574. 2582–2606. 2661–2665.

In numerous other articles as well as isinglass or gelatine; competition between the foreign article and the home article should not be destroyed, 2606–2609——With regard

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Wallington, Richard Arthur. (Analysis of his Evidence)—*continued.*

to the remedy of adulterations, the term "adulteration" must first be defined, 2610, 2611——The Treasury or some other department of Government should prohibit the importation or sale of those articles which they consider to be improperly adulterated, 2610, 2611. 2619, 2620. 2622–2626——Objection to a central commission or board of examiners, 2611——Objections also to the local inspectors suggested by Dr. Hassall, 2611, 2612. 2649–2654. 2674.

Evidence in favour of its being left mainly to the trade itself to prohibit injurious or fraudulent adulterations; the evil thereby would work its own remedy, 2611 *et seq.*——Suggested permission generally to file interrogatories against any person selling articles prohibited by the resolution of the Treasury; how such system of interrogatories would work, 2617 *et seq.*——Sufficient protection at present to the public in regard to coffee, adulteration, as an abuse, being of very rare occurrence, 2629–2633——In the great majority of instances the interrogatories would be answered truly, 2636. 2670, 2671. 2674——Grounds upon which injunctions prohibiting the sale of adulterated articles should be granted, 2636–2649.

Advantages of the proposed system of interrogatories over that of inspectors, and an examination of the article, 2649–2666——With regard to the public or the trade not protecting itself against false weights and measures, there is no analogy between the same and the remedy proposed by witness in regard to adulteration, 2676–2680——Reference to evidence before a former Committee of the House as having been opposed to any interference with the adulteration of spirits, 2680, 2681——The general plan proposed by witness for preventing adulterations would not interfere with special remedies for special cases of adulteration, 2682.

Warington, Robert. (Analysis of his Evidence.)—Chemical operator to the Apothecaries' Company, and resident director; follows also his profession as a consulting and analytical chemist, 355–357——Particulars relative to the glazing of green tea before it comes to this country; substances used for the purpose, 358, 359. 365–378——Nature of unglazed tea as imported and as sold by the wholesale dealers, 359–364——The glazing of tea is done for the purpose of making it more attractive to the eye; how far it is injurious to health, 366. 371–377——Green and black teas are often made from the same plant, the difference between them arising from the different modes of drying, 368–370.

"Lie" tea contains from forty to fifty per cent. of earthy matter, and is not a tea plant at all, 379, 380. 388–392——It is sold by the Chinese to the English merchants for the purpose of adulteration, 380–387. 417–420. 433——Admission of lie tea on the payment of the usual duty, 385. 394–396. 421. 434–437——Quantity of lie tea now imported; larger quantity at one time, 385. 393–402——Fraud upon the poorer classes by the sale of lie tea for real tea, 403–405. 408, 409——Means for detecting lie tea, 406, 407——Lie tea or adulterated tea, though made in China, is never used by the Chinese, 410–416——The adulteration of tea mainly takes place abroad, 422. 430–432——Instance of the fabrication of tea in this country, 423. 438——All the samples examined by witness were procured from wholesale dealers, 426–428.

Precautions taken so as to ensure the sale of genuine drugs at Apothecaries' Hall, 441–448. 452–460. 465–467. 486——Considerable adulteration in the case of scammony; great variety in the price, 449——Adulteration in the case of opium, 449. 451——Purposes for which scammony is used, 450——Considerable adulteration practised by the drug grinder, 460–462——Power of the Apothecaries' Company to visit apothecaries' shops, but not those of chemists and druggists; it is not now exercised, 468–470——Check upon the adulteration of drugs if there were some system of inspection, 471, 472.

Power of the College of Physicians to visit the shops of chemists and druggists; their practice hereon, 473–480——Right granted to the Admiralty to inspect Apothecaries' Hall, whence all the drugs for the navy are supplied, 481, 482——Supply of drugs also to the East India Company, and, conjointly with Messrs. Savory, to the army, 482–484——Comparatively high prices necessarily charged at Apothecaries' Hall, 485, 486——Yearly sale of a large quantity of English-grown rhubarb to wholesale druggists, 487–489——Medicinal effect of English rhubarb, 490, 491——Difference between Turkey rhubarb and Russian rhubarb, properly so called, 492–495.

Difficulty in proceeding at law against druggists who profess untruly to get all their drugs from Apothecaries' Hall, 496–499——Nature of the adulterations of arrow-root, 500–503——Regulations as to price, &c. under which the navy is supplied by the Apothecaries' Company, 504–507——Purity of the cod liver oil sold by the company; considerable adulteration in this article generally, 508–519——Adulterations of mustard as tested by witness, 520, 521——Also of isinglass, 522, 523——Also of quinine, 524. 529, 530——The Apothecaries' Company have sent enormous quantities of quinine to the Crimea; also to the East Indies, 525——Depreciation frequently as regards chloroform, but less by adulteration than by the action of the elements on each other, 526–528.

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Water Supply:

1. *Impurity of the Water supplied to the Metropolis.*
2. *Injurious Effect upon the Public Health.*
3. *Means available for an improved Supply.*

1. *Impurity of the Water supplied to the Metropolis:*

Organic substances found by witness at all times in the water supplied to London; this will not be entirely amended when all the water is taken from above Thames Ditton, *Hassall* 254. 257–264——Inferiority of the water to that supplied to other towns in the country; diagram delivered in in illustration, *Thomson* 1300, and *App. p.* 138——Reference to and explanation upon other diagrams (*App. p.* 138) representing the different degrees of impurities and hardness in the water supplied to London by the different companies, *ib.* 1300–1302.

Increasing impurity as the river descends from Thames Ditton, *Thomson* 1301, 1302——Reference to another diagram (*App. p.* 138) representing the condition of the river at high water and at low water, *ib.* 1302——The influence of the salt water varies a good deal at different times, *ib.* 1303.

Further evidence in detail with reference to the impurities and general condition of the water supply of London, *Thomson* 1304 *et. seq.* —— Greater impurity, both at high water and low water, at Hungerford than at London Bridge; causes thereof, *ib.* 1305–1317——Tabular statement of the actual composition of the water supplied by the several companies, *ib.* 1352——Much greater impurities generally at high water than at low water; explanation on this point, *ib.* 1305–1315. 1425–1429.

Distinction between mechanical, organic, and inorganic impurities, *Thomson* 1315. 1332–1334——Statement of the mechanical matter in the water as taken from alongside the "Dreadnought" off Greenwich, *ib.* 1321–1325. 1329–1331. 1365–1369. 1422, 1423——Imperfect state and irregular action of the sewers considered, in connexion with the different character of the water at different periods, *ib.* 1336–1350——Hard and calcareous character of the water adverted to, as entailing waste in the consumption of soap, and a loss to the public in other ways, *ib.* 1355–1360.

2. *Injurious Effect upon the Public Health:*

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TO

REPORTS

FROM THE

SELECT COMMITTEE

ON

ADULTERATION OF FOOD, &c.

Ordered, by The House of Commons, *to be Printed,*
8 *August* 1855.

480—I.

Under 8 *oz.*

531

MINUTES OF EVIDENCE

TAKEN BEFORE THE

SELECT COMMITTEE

ON

LUNATIC ASYLUMS (IRELAND) (ADVANCES) BILL;

WITH THE

PROCEEDINGS OF THE COMMITTEE.

(*Colonel Dunne.*)

Ordered, by The House of Commons, *to be Printed,*
24 *May* 1855.

Lunæ, 26° *die Martii*, 1855.

Lunatic Asylums (Ireland) (Advances) Bill committed to a Select Committee.

Lunæ, 16° *die Aprilis*, 1855.

Committee nominated:—

Mr. Horsman.	Mr. Fagan.
Sir J. Trollope.	Mr. Stanley.
Mr. Macartney.	Mr. Francis Scully.
Mr. Robert Palmer.	Mr. Byng.
Sir J. Duckworth.	Colonel Dunne.
Mr. E. Denison.	

Ordered,—That Five be the Quorum of the Committee.

Martis, 1° *die Maii*, 1855.

Ordered,—That the Committee have power to send for Persons, Papers, and Records.

Mercurii, 2° *die Maii*, 1855.

Ordered,—That Mr. Robert Palmer be discharged from further attendance on the Committee, and that Captain Duncombe be added thereto.

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PROCEEDINGS OF THE COMMITTEE.

Jovis, 26° *die Aprilis*, 1855.

MEMBERS PRESENT:

Sir J. Trollope.	Mr. Robert Palmer.
Colonel Dunne.	Mr. Evelyn Denison.
Mr. Francis Scully.	Sir John Duckworth.
Mr. Horsman.	Mr. Macartney.

Sir JOHN TROLLOPE was called to the Chair.

Committee deliberated.

[Adjourned to Tuesday next, at One o'clock, to consider course of Proceedings.

Martis, 1° *die Maii*, 1855.

MEMBERS PRESENT:

Sir JOHN TROLLOPE, in the Chair.

Mr. Horsman.	Mr. Stanley.
Mr. Macartney.	Mr. Robert Palmer.
Mr. Fagan.	Mr. Evelyn Denison.
Mr. Byng.	Sir John Duckworth.
Mr. Francis Scully.	Colonel Dunne.

Committee deliberated.

Preamble read, and postponed.

Motion made, and Question, "That the Chairman be instructed to move the House for power to send for Persons, Papers, and Records," (Mr. *Fagan*), put, and agreed to.

[Adjourned to Friday, at One o'clock.

Veneris, 4° *die Maii*, 1855.

MEMBERS PRESENT:

Sir JOHN TROLLOPE, in the Chair.

Mr. Horsman.	Sir J. Duckworth.
Mr. Macartney.	Colonel Dunne.
Mr. Francis Scully.	Mr. Robert Palmer.
Mr. Byng.	Colonel Dunne.
Mr. E. Denison.	Mr. Stanley.
Mr. Fagan.	Captain Duncombe.

Dr. *John Nugent* examined.

Motion made, and Question put, "That no further evidence is necessary as regards the Bill referred to the Committee," (Mr. *Horsman*). Committee divided:

Ayes, 6.	Noes, 4.
Sir John Duckworth.	Colonel Dunne.
Mr. Horsman.	Mr. Macartney.
Mr. E. Denison.	Mr. Fagan.
Mr. Byng.	Mr. Scully.
Mr. Stanley.	
Captain Duncombe.	

[Adjourned to Tuesday, 8th instant, at One o'clock.

Martis, 8° die Maii, 1855.

MEMBERS PRESENT :

Sir JOHN TROLLOPE, in the Chair.

Captain Duncombe.	Mr. E. Denison.
Mr. Francis Scully.	Mr. Stanley.
Sir John Duckworth.	Mr. Byng.
Mr. Horsman.	Mr. Fagan.
Colonel Dunne.	

Clause 1 read 1°, 2°, and considered.

Amendment proposed, After the word " so," in line 2, to insert the word " heretofore," (Colonel *Dunne*). Question put, " That the word ' heretofore ' be there inserted." Committee divided :

Ayes, 4.	Noes, 5.
Mr. Fagan.	Mr. Horsman.
Mr. Scully.	Mr. Byng.
Sir J. Duckworth.	Mr. Stanley.
Colonel Dunne.	Mr. E. Denison.
	Captain Duncombe.

Amendment proposed in line 3, After the word " already," to insert the words, " handed over, or shall be hereafter handed over, to the Governors of such Asylum fit for the reception of the lunatic poor, as provided by the Act 1 & 2 Geo. 4, c. 33," (Colonel *Dunne*). Question, " That those words be there inserted," put, and agreed to. Clause amended.

Amendment in line 19 proposed, and Question put, " To leave out all the words from the word ' poor ' to the end of the clause." Committee divided :

Ayes, 2.	Noes, 8.
Mr. Fagan.	Mr. Horsman.
Colonel Dunne.	Mr. Byng.
	Mr. Scully.
	Mr. Stanley.
	Mr. E. Denison.
	Sir J. Duckworth.
	Captain Duncombe.
	Mr. Macartney.

Line 24, Amendment proposed, and Question, After " Ireland," to insert the words, " not being members of the Board of Works," (Colonel *Dunne*), put, and negatived.

Amendment proposed, At the end of the Clause, to add the words, " Provided that in case any difference of opinion shall arise as to the fitness of any asylum for the reception of the lunatic poor between the Governors and the Board of Works, it shall be lawful for the Governors to refer the question to the Lord Lieutenant in Council, who is hereby empowered to decide between them," (Mr. *O. Stanley*). Question, " That these words be there added," put, and agreed to.

Amendment proposed, To add at the end of the last Amendment, the following words: " Provided further, in all cases where the Governors of any Lunatic Asylum allege, by memorial to the Lord Lieutenant, that there has been expended, without any order of the Lord Lieutenant in Council, in the erection of such Lunatic Asylum, sums of money over and above the original estimates for the building thereof, and that such illegal expenditure has been useless and wasteful, it shall be lawful for the Lord Lieutenant to inquire into the said allegation, and to order evidence to be taken thereon ; and it shall be lawful for the Lord Lieutenant after such inquiry to make such remission of the money so expended as he may think fit," (Mr. *Fagan*). Question put, " That those words be there added." Committee divided :

Ayes, 4.	Noes, 6.
Mr. Fagan.	Mr. Horsman.
Mr. Scully.	Mr. Byng.
Mr. E. Denison.	Mr. Stanley.
Colonel Dunne.	Sir J. Duckworth.
	Captain Duncombe.
	Mr. Macartney.

Clause as amended, read, and agreed to.

Clause 2, read 1°, 2°, and agreed to.

Clause

Clause 3, read 1°, 2°, and considered. In line 37, Amendment proposed, After the word "established," to insert the words, "and it shall appear to the Grand Jury to have been handed over to the Governor fit for the reception of the Lunatic Poor," (Colonel *Dunne*). Question put, "That those words be there inserted." Committee divided :

Ayes, 2.	Noes, 7.
Mr. Scully.	Mr. Horsman.
Colonel Dunne.	Mr. Byng.
	Mr. Stanley.
	Mr. E. Denison.
	Sir J. Duckworth.
	Captain Duncombe.
	Mr. Macartney.

Question, "That this Clause stand part of the Bill," put, and agreed to.

Clause 4, read 1°, 2°, and agreed to.

Clause 5, read 1°, 2°, and considered. Question, "That this Clause stand part of the Bill," put, and negatived.

Clause 6, read 1°, 2°. Question, "That this Clause stand part of the Bill," put, and agreed to.

Clause 7, read 1°, 2°, and agreed to.

Preamble read, and agreed to.

Question, "That the Bill as amended be reported to the House," put, and agreed to.

To Report.

MINUTES OF EVIDENCE.

Veneris, 4° die Maii, 1855.

MEMBERS PRESENT:

Mr. Horsman.	Mr. Stanley.
Sir John Trollope.	Mr. Francis Scully.
Mr. Macartney.	Mr. Byng.
Mr. Robert Palmer.	Colonel Dunne.
Sir John Duckworth.	Captain Duncombe.
Mr. Evelyn Denison.	

SIR JOHN TROLLOPE IN THE CHAIR.

Dr. *John Nugent,* called in; and Examined.

1. YOU are, I believe, Inspector-General of Lunatic Asylums in Ireland?—Yes, I am.

2. How long have you held that post?—Over eight years.

3. When were you appointed?—At the close of 1846.

4. By whom?—By Lord Besborough.

5. At the time that Lord Besborough was Lord Lieutenant of Ireland?—Yes.

6. I believe you carry on the works connected with the lunatic asylums in Ireland through the Board of Works?—Yes.

7. What are the powers of the Board of Works; have they the administrative control?—The Board of Works hold their office as the representatives of the Board of Control; a body established by the 1st and 2d George the Fourth. The powers of that body expired about the year 1834 or 1835, and then the Board of Works was appointed. The authority which was before in the Board of Control was delegated to the Board of Works.

8. Has the Board of Works the financial control of all the Irish Lunatic Asylums?—With regard to the erection of the establishment they have, but not after an asylum is established. They then have nothing further to do with it.

9. Who is the chairman of the Board of Works?—Mr. Griffith. They hold their office directly under the Treasury.

10. What control has the Treasury over the expenditure; is it simply financial?—It is simply financial.

11. Does the Treasury do more than audit the expenditure?—The expenditure is audited by the Board of Audit Commissioners in Somerset House.

12. Transmitted to them through the Treasury?—Yes; that is *quoad* the erection of the asylum; but as to the sustaining and support, the expenditure is sent direct from the asylum to the Audit Office.

13. By whom is the sustaining and the reparation of the Asylum carried on?—The money is always advanced from the Consolidated Fund, under Orders in Council by the Lord Lieutenant.

14. And repaid?—And repaid, half-yearly, by presentments that are compulsory on each county and city; compulsory on grand juries to present.

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15. How is the payment made when two or three counties conjoin together for the purpose of an asylum?—In proportion, by each county and city, as to the number of patients, and the expense originally laid down for the counties and cities.

16. Is the expense calculated at per head, or by the area, over which the charge runs?—It is calculated per head, according to the accommodation which each county has in the asylum.

17. Now, have the different Acts of Parliament which regulate these asylums been carried into strict effect?—As far as I can judge of them, they have, except so far as the new Act is necessary to meet an oversight.

18. You refer to the Bill under discussion?—Yes; that is for the purpose of obviating some oversights.

19. Have those occurred under your direction, or under the direction of the Board of Works?—Under the direction of the Board of Works.

20. You have no control over those?—None.

21. Has it entered into your province to apply to the Lord Lieutenant in Council for any order?—All the orders for the maintaining and support of the asylum are sent by our office to the Privy Council; they are approved of by us first, and afterwards passed in Council.

22. Have you omitted to apply for those forms in any case?—No.

23. As far as your office is concerned, everything has been conducted with perfect exactness and regularity?—Yes, it has.

24. Your answer, I presume, is with reference to sustenance and reparation?—Yes. The quarterly estimates for the maintenance and support of the asylum are transmitted by our office to the Privy Council.

25. Has any irregularity occurred with regard to the orders for erection?—Yes.

26. Mr. *Horsman.*] The lunatic asylums in Ireland have been erected under the 1 & 2 Geo. 4?—The first Act passed was the 57 Geo. 3, in 1817; the 1 & 2 Geo. 4 was passed in 1821. The 57 Geo. 3 gave authority to the Lord Lieutenant to erect district asylums in Ireland, and under that Act only one asylum was erected, the Armagh asylum; it was commenced in the very year that the 1 & 2 Geo. 4 was passed, and the 1 & 2 Geo. 4 was passed inasmuch as the 57 Geo. 3 was not sufficiently comprehensive; but still it was sufficiently comprehensive to admit of the commencement of the erection of the asylum mentioned.

27. Then what were the provisions of the 1 & 2 Geo. 4, respecting the power of the Lord Lieutenant to direct lunatic asylums to be built and districts to be established?—The Lord Lieutenant was authorised to erect in Ireland as many asylums as he thought fit, and also to subdivide the country into districts of one or more counties to each asylum.

28. He had the power of directing any number of asylums to be erected absolutely?—Without any reference; absolutely.

29. It was necessary that he should make it known when he gave any such directions by an Order in Council?—Yes; he was to do it with the consent of the Privy Council.

30. And the Order in Council was to be published in the Gazette?—Yes, it was.

31. And when it was published in the Gazette, he gave directions to the Board of Works to proceed with the building of the asylum?—The Board of Works was not in existence then; he gave authority to the Commissioners to commence the works.

32. The Board of Works was established afterwards?—Yes, in 1835.

33. After the Board of Works received the directions from the Lord Lieutenant everything then was done entirely by the Board of Works?—Everything was done by the Board of Works.

34. Under that Act, the Lord Lieutenant, on application of the Commissioners, directs the money to be issued from the Treasury?—Yes, by Order in Council.

35. And he has the power again of directing it absolutely without any controlling power, either in the county or any other parties in Ireland?—Yes.

36. When the building is completed, what is the next step taken by the governors, or by the Board of Works?—The Commissioners of Public Works, who represent the former Board of Control, when the asylum is finished, intimate

intimate to the Lord Lieutenant that, in their opinion, the asylum is fit for the reception of patients.

37. Immediately after the passing of that Act there were a certain number of asylums built?—Yes.

38. How many were so built?—Nine.

39. Those were built under that Act?—Yes; there was one in Waterford, one in Clonmel, one in Limerick, one in Maryborough, one in Belfast, one in Armagh, one in Derry.

40. Ballinasloe also?—Yes.

41. And one in Carlow?—Yes.

42. And also Richmond?—The Richmond had been built previously, in 1815, as a common asylum for all Ireland, by a grant from Government.

43. These were all built between 1821 and 1833?—Yes; under the 1 & 2 Geo. 4 and 57 Geo. 3; nine were built within that period.

44. Can you state that the provisions of the Act as to giving the Order in Council, and publishing it in the Gazette, were complied with in those cases?—Yes, I apprehend so; I never heard the reverse.

45. Now, have they all been paid for?—Yes; there were 14 years allowed for the repayment; and the last, which was built in 1835, was repaid about 1849.

46. What have been built since?—As to the asylums built since by the Commissioners of Public Works, there is one at Cork; I think they commenced first at Cork; then Kilkenny, Omagh, Sligo, Mullingar, and Killarney; in fact, the Order in Council for three of them was passed the same day.

47. Have all these been built since 1847?—Yes.

48. In all these cases were there Orders in Council?—Yes; strictly correct.

49. And all duly gazetted?—Yes.

50. And all can be produced?—Yes; for the erection.

51. These asylums were all built under the Board of Works?—Yes; independent of these there was the criminal asylum at Dundrum, but for which the counties do not pay; that was another asylum erected by the Board of Works.

52. What is the course which the Board of Works take after the asylum is completed, in handing it over to the governors?—They intimate to the Chief Secretary that such and such an asylum is finished, and that they have taken it off the contractor's hands, and then the Chief Secretary intimates to our office that such is the case, and we put ourselves in communication with the governors to that asylum, who have been previously appointed.

53. They are the gentry of the county?—The first gentry of the county always or nobility.

54. And generally speaking, the leading gentry of the grand jury?—Yes; the Members of Parliament of the county are always *ex officio* governors; the Peers also; and then generally 10 or 12 of the largest proprietors who are diffused over the county to represent it.

55. *Chairman.*] What is their style; are they called visitors?—Board of Governors.

56. Mr. *Horsman.*] They are appointed under what Act?—Under the 1 & 2 Geo. 4.

57. They are nominated by the Lord Lieutenant in Council?—Yes.

58. *Chairman.*] You say that the particular persons you mention are governors *ex officio*?—Yes.

59. Is it the habit to appoint them, or do they hold their office?—As long as a gentleman is Member for a city or county, he sits on the Board for so long.

60. Sir *J. Duckworth.*] Is he by right a governor?—It is a matter of courtesy; the Lord Lieutenant has the appointment, in the first instance.

61. That is what I mean, the Lord Lieutenant is not compelled to appoint?—No, he is not.

62. There is nothing in the Act of Parliament to that effect?—No.

63. Mr. *Horsman.*] The Chief Secretary intimates to you that it has been notified to him that that asylum is complete and fit for the reception of patients?

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patients?—Yes; we then intimate to the manager of the asylum to call together the Board, and one of the inspectors goes down and sees the Board.

64. They meet at the asylum?—Yes, they do.

65. That is for the purpose of making arrangements for opening the asylum?—Yes, and to see about the servants and establishment; what dietary may be necessary, and the various economical questions connected with the institution.

66. And you were present at that meeting of governors?—Yes.

67. During the building of the asylum, is it any part of your duty or practice to visit the asylum?—It is not part of our duty to do that, because we have no authority one way or another. I invariably go and look at the asylum as they go on building, but I have no authority whatever to interfere; I may suggest, and that is all.

68. During the building of the asylum, is it the fact that you make a great many visits to that asylum?—Yes.

69. And that you make different suggestions and remarks upon its condition to the Board of Works?—Yes, I do.

70. Have you done so in all cases?—In various cases I have done so.

71. So that not only when the asylum is complete, and handed over to the Board of Governors, do you see it, but also when the building is going on you are practically aware of its condition?—Yes, I may go and look at it, but I have no authority to interfere. It occasionally has happened that I have given suggestions, some of which have been adopted, others have not; therefore I am not answerable or responsible for anything connected with the building; that rests with the Board of Works. I may suggest, but I have no authority whatever to direct.

72. But you have been practically in the habit of making suggestions? Yes.

73. *Chairman.*] Is there any uniformity of plan that you adopt for building these asylums?—There is a generally characteristic uniformity, though they differ in detail. They are similar, but not identical.

74. I suppose they are similar in their internal arrangements?—Yes; they are built upon the same construction.

75. Are the plans in no instance submitted to the Inspector of Lunatic Asylums?—Yes, as regards the quantity of room for each patient, and also everything in a sanitary point of view, but nothing whatever in a structural point of view; nothing with respect to the exterior.

76. Mr. *Horsman.*] It is your duty to inspect the asylums, and to point out anything defective in them, as regards the comfort and requirements of the patients?—Yes.

77. And at the opening of an asylum, when you meet the governors, if you find it in any way defective, or unfit for the reception of patients, it is your duty to point such defect out?—Yes.

78. Have you found it necessary to do so?—Yes; before the opening of the Sligo Asylum I met the gentry. An instance of that sort occurred there.

79. Did you make a representation of that matter to the Board of Works?—Yes, and I communicated with the Government.

80. And what occurred in consequence?—The consequence was, that the alterations that we wished to have done were carried out to a certain extent. Then it was made (though not perhaps as finished as we desired it) in such a state, that we considered it fit for the reception of patients.

81. And then it was handed over to the governors?—Yes.

82. And it has been used since for the patients?—Yes.

83. The governors were nominated by the Lord Lieutenant, some time before the asylum was opened?—Yes.

84. To whom does the Lord Lieutenant look to recommend him the names to put on the list?—Generally, the roll of gentry. The Lord Lieutenant asks us to select the gentlemen whom we think, from our knowledge of the county, best suited and calculated to fulfil the duties required of them. Of course the Lord Lieutenant has the power of passing over, or adding, or allowing those names to stand.

85. So that the Board of Governors, practically, are appointed upon your recommendation?—They are in a great measure.

86. Now,

86. Now, on a meeting of the Board of Governors at the asylum, is it their duty on that occasion to go over the building?—I think they do so invariably.

87. That is one of their first duties on the first day of meeting?—Yes, in a new asylum.

88. They go over the new asylum and inspect it, and see that it is handed over in a fit state for the reception of patients?—Yes.

89. I presume, no objection being made at the time, either by them or by you, as to its being in a fit state, it may be taken by the Board of Governors that no division exists?—Exactly so. Of course, going over a large institution of that kind, some gentlemen may think that it might be better, and others that it might be worse; but still the great question is, whether it is fit in a sanitary point of view. If there is nothing objectionable in the institution, of course there is no reason why it should not be occupied.

90. Besides these asylums which have been built at two different periods, under Orders in Council, three have been enlarged?—Yes.

91. What are those?—Ballinasloe, Clonmel, and Belfast have been enlarged.

92. Now, is an Order in Council, and the gazetting of that Order in Council, equally necessary for the enlargement of lunatic asylums, as for their building?—Yes.

93. In all these cases, was the Order in Council passed?—The Order in Council was passed, but it was not gazetted.

94. In those cases it was not gazetted, although it was passed?—Yes, there was one asylum where it was gazetted, viz., Dublin; but that may be considered altogether a new asylum. It is an addition to the asylum. Although separated from the asylum, it is on the asylum ground.

95. Colonel *Dunne.*] You mean Richmond, do you not?—Yes, I do.

96. Mr. *Horsman.*] In these three cases, where an enlargement was made, and where an Order in Council was passed but not gazetted, do you know whether the Order in Council was passed by the application of the Board of Governors of those asylums?—Yes; the Board of Governors found that the asylums were not sufficiently large for the exigencies of the district, and we memorialised the Lord Lieutenant to increase the asylums.

97. Mr. *Fagan.*] Be good enough to name those cases?—Ballinasloe, Belfast, Dublin, and Clonmel. At Clonmel, it was principally the taking (purchase) of additional ground. There was no structural increase beyond an infirmary.

98. Mr. *Horsman.*] The expenditure in each of these cases was on application of the Board of Governors?—Yes.

99. As far as we have gone as regards the first nine asylums that were built between 1821 and 1833, there was no irregularity of any kind whatever?—No irregularity that I am aware of.

100. As regards the next seven that were built under the Board of Works since 1847, so far as we have gone, there has been no irregularity whatever. The original Order in Council for the building of the asylum, and the formation of the district, was passed and was gazetted?—It was strictly correct.

101. The only irregularity that we have as yet come to was, that in the case of the three that were enlarged the Order in Council was passed, and was not gazetted?—Yes; the Dublin was done under an Order in Council, and gazetted.

102. Colonel *Dunne.*] And so far is legal?—Yes.

103. Mr. *Horsman.*] I believe there is no period fixed within which the publication in the Gazette must take place?—No; it says, it being duly gazetted and passed in Council: there is no specification as to the time; none whatever.

104. The asylums are enlarged under 8 & 9 Vict., c. 107?—Yes.

105. And there it says, that the Orders in Council are to be published in the Dublin Gazette, but it does not specify any period?—No.

106. But that Act does refer to the previous Act of 1 & 2 Geo. 4, to which we have alluded, and there again there is not any period fixed within which the publication in the Gazette must take place, except in so far as it states that it is only after publication in the Dublin Gazette that it shall be lawful for the grand jury to repay the amount by presentment?—Yes.

107. I will read the words of the Act: "And be it enacted, that at any time after any such Order of Council shall be made and published in the Dublin Gazette, it shall and may be lawful for the grand jury of any and every county,

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county of a city, and county of a town within any such district, or of which such district shall consist, at any assizes, to present such sum or sums of money to be raised off such county," and so on; so that the only period fixed for the publication in the Gazette is some time antecedent to the application for the repayment?—Yes.

108. In the case of these three asylums which have been enlarged, and in which the publication did not take place in the Gazette, of Clonmel, Belfast, and Ballinasloe, has repayment been made for those advances?—It has in Belfast; not for the erection of the asylum, but for the purchase of the ground. At the time that we memorialised to have a new structure at Belfast, we also memorialised that 16 or 20 acres of ground should be taken to afford additional occupation for the patients; that was purchased at the request of the Board by the Board of Works, and it amounted to somewhere about 4,300 *l.*; that sum was levied upon the counties forming that district without the Order in Council being passed.

109. Has that sum of money been repaid?—No, it is in progress of repayment; four years were given for the repayment, and a year and a half of that have expired.

110. Then there was a larger expenditure for that building?—Yes, 18,000 *l.*; the building is still in progress.

111. And repayment of that sum has not been asked?—No.

112. In the case of Clonmel, has repayment been made or applied for?—None has been made as yet or applied for beyond 900 *l.*

113. What is the case with respect to Ballinasloe; has repayment been made there?—No; not at least that I am aware of. I cannot positively say, but I am almost positive that none whatever has been paid in Ballinasloe.

114. You are a member of all the three Boards?—Yes.

115. Colonel *Dunne.*] Any for Clonmel?—Not more than I mentioned; and at Belfast merely for the purchase of land.

116. With respect to this latter class of places, which have been built since 1847 by the Board of Works, upon which there has been a large expenditure advanced by the Government, repayment has not yet been made?—No.

117. Do you remember the whole amount of the expenditure?—About 340,000 *l.* to 350,000 *l.*; I think it was 343,000 *l.*

118. Killarney, Cork, Mullingar, Sligo, Omagh, and New Richmond?—Richmond is an addition; it is on the same ground, though separated from it.

119. *Chairman.*] The old Richmond Asylum was built when?—The old asylum was built in 1815 by a grant from the Crown.

120. Is the new and old Richmond under the same jurisdiction?—Yes, the old Richmond was originally built as the main asylum for the whole of Ireland; afterwards, when district asylums were established, Government made a present of the Richmond Asylum to the district called the Metropolitan district, for Dublin and the three counties adjoining.

121. Were they ever called upon to pay anything towards it?—No, it was a a clear present.

122. Have these additional sums raised for the new Richmond been paid?—They are not paid, inasmuch as the house is not yet finished; it is occupied for the last six or eight months by patients, but it is generally some months before the Privy Council divide the payments over the county.

123. There is no irregularity there?—Yes, there is, with reference to Treasury advances.

124. Sir *J. Duckworth.* The only cases in which irregularity is supposed to have arisen from the absence of insertion in the Gazette are Clonmel, Belfast, and Ballinasloe; and the only one that has repaid any money is Belfast?—Yes, for ground alone.

125. Mr. *Horsman.*] Now for each of these asylums there are two classes of Orders in Council; in the first place, when the direction is given to build the asylum, and to apportion the districts for it?—Yes, that is the original order.

126. Has that in every case been complied with?—Yes.

127. Then you require another Order in Council in each case where money is issued for the costs?—Yes.

128. Has that second Order in Council in all these cases been issued?—No; it was ordered for about half the amount of money that was expended; in the other half it was not so.

129. Do you know how that irregularity occurred?—I understand it was owing to the fact that the clerk to the Board of Works, who was the head accountant, was removed some five or six years ago, and the gentleman who took his place was not aware of the circumstance; of the necessity of applying to the Privy Council; and he wrote directly to the Treasury for the money, and the Treasury gave it; and getting it in the first instance he did so ever afterwards.

130. Do you remember the course of the removal of that clerk?—He was sent to America after some defaulter.

131. What was his name?—Manifold.

132. He was sent to arrest a defaulter?—Yes. At that time destitution and poverty were very great, and the Board of Works had a number of irons in the fire; Mr. Adams was appointed, and he applied to the Treasury instead of to the Privy Council; since 1848, with a few exceptions, they have got all the money from the Treasury.

133. Without the intervention of Orders in Council?—Yes.

134. Mr. *E. Denison.*] Has this large sum of 340,000 *l.* been entirely spent on the three buildings?—No, on the seven.

135. Captain *Duncan.*] Were the additional sums to which you refer as obtained afterwards exceeding the original estimate?—There was no estimate ever given.

136. Mr. *Horsman.*] Will you be good enough to state how much of the expenditure was issued under Orders in Council, and how much without?—£. 158,593. 4 *s.* 7 *d.* were Orders in Council, and 155,380 *l.* were orders without the intervention of the Council; it is altogether 313,973 *l.* 4 *s.* 7 *d.* instead of, as I said before about 340,000 *l.*: that is for the whole seven.

137. Does that include the expenses of the enlargement of these three asylums as well as for the building of the seven others?—Yes.

138. Mr. *Macartney.*] The first part under the original Act I shall not refer to at all, because my own knowledge is that everything there was perfectly in accordance with the statute; therefore, we will confine ourselves to that portion of your evidence which comes under the alteration of the Act; can you produce the Order in Council for Cork?—Yes.

139. The first Order in Council?—Yes.

140. Is the original here?—Yes (*the Witness produces the same*).

141. What is the date of it?—It is dated June 26th, 1846.

142. After the Order in Council, was any plan submitted to you for an extended accommodation of the Cork district?—Yes, to our office.

143. Do you recollect whether you approved of that?—That was some months prior to my appointment, but it was approved of.

144. In your office?—Yes.

145. In the usual way?—Yes.

146. Are you aware of the estimate for the completion of the work?—There was no estimate ever sent in; there is no necessity for an estimate being sent in in any instance where an asylum is built.

147. Upon what ground do you make that statement?—Because there is no Act of Parliament requiring it; all that is done is this: the Board of Works are told to erect an asylum for a certain number of patients; they are not limited as to the quantity of money that is to be expended on the erection of the asylum.

148. Then am I to understand you to say, that no estimate has been given for the erection of the Cork Lunatic Asylum that you have seen?—There is an estimate of 52,000 *l.*; but that does not take in the fittings, the furniture, or the purchase of the ground.

149. That is the first estimate of what is called the shell?—Yes.

150. Was there any other estimate for the furnishing and fittings ever submitted to you?—No.

151. You have never seen any?—No.

152. When was Cork Asylum completed?—About 1852; about two years and a half ago; during Lord Eglinton's administration.

153. It was certified completed?—Yes.

154. And occupied?—Yes.

155. By what authority was it certified to be completed?—It was certified by the inspector as fit for the reception of patients, after the usual certificate from the Board of Works to the Chief Secretary's Office.

 156. Without

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156. Without the assistance or joining in that report of the local governors? —The local governors did not object to it.

157. That was in 1852?—That was in 1852.

158. *Chairman.*] When was that commenced?—In 1847; the purchase of the ground was at the close of 1846; I think they commenced it in 1847.

159. Mr. *Fagan.*] You say that the work was completed in 1852?—Yes.

160. And certified to be completed with no objection on behalf of the local governors?—Yes.

161. That was the stage in which a fit and proper Order in Council ought to have been made to charge the county?—Yes, subsequent to that.

162. Was any Order in Council then made for the amount of 1852, and the additional fittings by the Board of Public Works?—No.

163. Has any order ever since been made?—Not that I am aware of.

164. The governors are in possession of the house at Cork?—Yes.

165. And have received inmates?—Yes; I think the Board of Works got 41,000*l.* by Orders in Council to erect the Cork Asylum, and 41,000*l.* additional to complete it.

166. In 1852, the house was finished, and now we are in 1855, and no document has been published to the grand jury?—Not that I am aware of.

167. In consequence of the want of the Order in Council?—Yes.

168. That is your view of the matter?—Yes, I fancy so; by the necessity of bringing in the Bill, that the Government consider they could not legally claim it.

169. Since 1852, inmates have been supported in that house?—Yes.

170. Have any orders been issued for the maintenance of the establishment and for the advances made?—Constantly.

171. Have presentments been made by the grand jury to the county and city of Cork for whatever there was in addition to repay?—Yes.

172. Up to what period?—Up to the last Session.

173. As far as the maintaining under the several statutes for the lunatics and the payment of the establishment charges, the money advanced by the Government by orders in Council has been repaid by the counties?—Perfectly.

174. Have any objections been made since 1852 as to the insufficiency of the works, and the incompleteness of the works in the county of Cork?—Yes.

175. Have you any document to show, in addition to the 52,000*l.*, for the shell; what is the remainder?—I think it cost about 11,000*l.*, between the inquisition and various other things, for the purchase of the land.

176. *Chairman.*] Now, give us the fittings?—I apprehend the 52,000*l.* did not cover the expenses of the structural parts of the building.

177. Mr. *Fagan.*] Have you any document that strengthens your opinion upon that subject?—I have a negative proof, inasmuch as the furnishing of the house would not have made up the difference between the 52,000*l.* and the 11,000*l.*, and must therefore have been expended upon the building itself.

178. Will you be good enough to give the Committee the total expenses of the Cork building?—£. 82,000.

179. I understand from you that the original estimate was 52,000*l.*?—I calculate it at that sum, at a rough guess.

180. And 10,000*l.* or 11,000*l.* for the ground?—Yes.

181. That is 63,000*l.*?—Yes; then there is the furniture, and the enclosing of the ground, and various other things; but there is no necessity for an estimate in any asylum. The direction is this: that an asylum is to be built for so many patients; consequently that asylum is built for 300, 400, or 500 patients. You find, in some localities, asylums are built cheaper than in others; whereas, if there was a fixed sum for them, it would be the same in all institutions where there was the same number.

182. In the case of the enlargement of the asylum it was necessary, you said, to publish it in the Gazette, previous to making it a legal expenditure?—Yes.

183. In the case of the Cork Asylum, after the first plans were submitted to the Lord Lieutenant, were there any alterations or enlargements in that building?—No, there were no enlargements.

184. There

184. There were no alterations from the plan that was first submitted?—There might be very minor alterations. Whatever alteration was made, was with the view of curtailing the expenses of the building.

185. Do you recollect whether the basement story that now exists in that asylum was in the original estimate?—I think so. I believe, too, while they were building the asylum, and excavating the ground, a great many things occurred which had the effect of inducing the Board of Works to change in some respect their original intention. If they came down on a place which was not quite suitable to the original plan, where there was moisture or a spring, of course it would be necessary to make an alteration.

186. If it turned out that an expenditure something over 7,000 *l.* was made in consequence of alterations that were deemed necessary, would that expenditure of 7,000 *l.* not being published in the Gazette be an illegal expenditure?—I am not competent to give an opinion of the legality or illegality of the question.

187. I thought you stated it was necessary to make the expenditure legal, when an enlargement or alteration took place, that it should be published?—The enlargement or alteration referred to asylums already built, but it rests with the Board of Works in the progress of a building to change it as they think fit. There was a specific Act passed, allowing the Lord Lieutenant to increase the accommodation in asylums already built, as previous Acts were not sufficient for that object.

188. Have you any recollection of having repeatedly pressed the governors of the Cork Asylum to allow the patients from the Cork Asylum to be introduced into the new building?—Yes. I was anxious upon the subject; it was such a dangerous concern, underground, and in such an unhealthy situation, that we were very desirous that the patients should be brought from the old asylum, which was in a most unsuitable locality; and we consequently hurried on the patients from the old to the new asylum.

189. Did the governors resist those representations on the ground that the new building was not fit for the reception of the patients?—No.

190. Now you visited Cork Asylum during its progress, repeatedly?—Constantly; frequently. Whenever I went down to visit the old asylum, I invariably went up to the new.

191. Did you make any representations to the Government during the progress of those works?—I did not like, in many respects, the way it was going on. It was never a favourite asylum of mine, and I did not like the construction of it either.

192. Are you aware that the governors, during the progress of that work, attempted several times to visit it, and make representations during the progress of the works?—Yes.

193. Are you aware that they made representations to the Board of Works of the refusal of the architect, and that the Board of Works sustained their architect?—I have heard it on common report, and I believe it is the fact; I never saw the document.

194. After the building was certified for the reception of patients, and the patients were introduced in it, did you visit the asylum shortly afterwards?—Immediately afterwards.

195. Are you aware that immediately after it was found that the place was scarcely habitable by the patients?—I wish to explain that, because I am more or less implicated in this matter. The patients occupied the asylum in June. In June, July, August, and September, the house showed no signs of damp; then, when the wet weather set in, the house was evidently very damp, and, in particular parts, was not habitable.

196. Will you state precisely your knowledge of the condition of the building, and what occurred in the building in consequence of this?—I constantly attended the Board. I was very often there. I think it was about the beginning of the subsequent year after its occupation that the dry rot began to show itself in the hall, and in the Board-room principally. I spoke to the Commissioners of Public Works on the subject, and they considered it was owing to the natural dampness of the climate, and also to the house being very recently built, but that in the course of time it would dry up. It, however, continued so six or eight months. On various occasions the Board met; and, at one time, when I was present, it was proposed to send over for an architect to

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come and visit it from England to report upon its state and condition. I then suggested that the legitimate course for the Board to adopt would be to communicate with the Government. Subsequent to that, Sir John Benson and Mr. Owen were appointed by Government to report upon the general condition of the building, which they did; and subsequent to that period various alterations and improvements took place.

197. At that time were new floors put in?—Yes.

198. And new ceilings made?—Yes.

199. Have you heard, or have you any notion, of what the expenditure consequent upon that was?—I have no idea. I know the fact, but I have no idea of what the cost was.

200. How many months subsequent to the reported completion of the house did all this occur?—It came to the point that there was no necessity to interfere in the course probably of 18 or 20 months. In point of fact, it is within the last year that they have cut away the joists, and altered the floors, and stuccoed the interior and cemented the outside of the house. That has occurred within the last six or eight months.

201. Was this all done under contract?—I cannot answer that question; that is not my department.

202. *Chairman.*] Had the buildings been certified before these alterations became necessary by reason of the dampness of the building?—So far as it was inhabited.

203. Could it have been inhabited without a certificate?—Certainly not without one to Government at first from the Board of Works; the very fact of our putting in the patients stands as a certificate itself from the inspectors.

204. But you gave no formal certificate of its fitness as a habitation?—No.

205. Are you ready to give it now?—Yes.

206. Have all these imperfections been remedied, so that it is now a wholesome building?—I do not think you can say that it was an unwholesome building. If it had been allowed to go on, the dry rot would have extended very materially through the house, and it was to obviate that that the Board of Works and Sir J. Benson and Mr. Owen made the alterations, which, I believe, are effectual.

207. Sir John Benson is an architect, is he not?—Yes.

208. Was the health of the patients ever affected by the state of the building?—No. A scurvy broke out for a short time with the patients, but that had nothing whatever to do with the state of the house. It was said to be owing to the want of a sufficient quantity of vegetable food to give to the patients.

209. It was owing to the dietary?—Yes. I am not aware of a single patient having suffered in consequence of any structural imperfections.

210. Colonel *Dunne.*] Are you aware of the Act of 1 & 2 Geo. 4, relative to lunatic asylums?—Yes.

211. Was that repealed by any subsequent Act?—No, it was not.

212. Therefore any enactment of that Act remained in force at the time of these buildings, and the requirements of that Act should have been performed?—Yes.

213. Do you recollect the third section of that Act, which enjoins the publication in the Gazette of the Order in Council constituting these asylums, or associations of counties for asylums?—Yes.

214. When the Order in Council was gazetted, was it not necessary that an application should be made to the county or counties concerned for a presentment for the erection of these establishments?—No, not for the erection; because the Lord Lieutenant has a distinct and unqualified power to order out of the Consolidated Fund any sum of money that he may think fit for the erection of these buildings.

215. Have you read the third section of the Act of Parliament?—Yes.

216. Will you be good enough to read it again?—Yes. "And be it further enacted, that at any time after any such Order of Council shall be made and published in the Dublin Gazette, it shall and may be lawful for the grand jury of any and every county, county of a city, and county of a town within any such district, or of which such district shall consist, at any assizes to present such sum or sums of money to be raised off such county, county of a city, or county of a town respectively, as shall be requisite for defraying the expenses of erecting and establishing such asylum, and for maintaining the same, to such amount and in such proportions as shall be directed by any order to be made by the Lord Lieutenant

Lieutenant or other chief governor or governors of Ireland, by and with the advice of His Majesty's Privy Council in Ireland."

217. You are aware of the practice of the grand jury in the erection of all public works: that the first proceeding is a presentment, as it is technically called?—Yes, but this is a mandatory direction from the Lord Lieutenant. The grand jury have no option; they must present.

218. What sum?—Any sum; the grand jury would be obliged to present any sum under 10,000 *l.*, inasmuch as there is a specific Act that the Lord Lieutenant can advance to any asylum 10,000 *l.* at any quarter. So long as it does not exceed the sum of 10,000 *l.*, he can demand from the district that sum.

219. Has that any reference to lunatic asylums?—It is a specific Act with reference to it; it is the 6 Geo. 4. It says, "It shall and may be lawful for the Lord Lieutenant, or other chief governor or governors of Ireland, by and with the advice of his Majesty's Privy Council in Ireland, from time to time, and at any time or times after any asylum erected or to be erected in pursuance of the said recited Act shall be fit for the reception of lunatic poor, to order and direct that any sum or sums of money, not exceeding the sum of 10,000 *l.* in any one quarter of a year, shall be advanced and issued and paid out of the growing produce of the Consolidated Fund." The marginal note is, "After any asylum shall be fit for the reception of the lunatic poor, the Lord Lieutenant may direct any sum not exceeding 10,000 *l.* per quarter to be issued out of the Consolidated Fund for the support of such establishment." That is the general meaning of that clause. Then the next is, that the grand jury of the county is to make a presentment for the repayment of the money so advanced; and if they refuse to make the presentment, the judge is to order it.

220. Is that after a certificate of the fitness of the asylum?—Yes.

221. How does that apply to one, then, that never was built at all. What I am calling your attention to is the Act for the building; you have replied by an Act that enables the Lord Lieutenant to raise 10,000 *l.* after the building is complete?—I meant to answer you by saying that the grand jury have no authority, to the amount of 10,000 *l.*, to refuse.

222. Therefore the Act of Parliament has nothing whatever to do with this clause that I am examining to; I wish to know how you explain that in an asylum in which three counties are associated, each county can present a proportionate sum without such sum having been mentioned, or an estimate given to the county for the entire sum required for the asylum?—If you look to the practice it is easily understood. The practice is this: the Lord Lieutenant is authorised to advance any sum of money, no matter how large, for the erection of an asylum; that asylum we will say belongs to a district that contains three counties; as soon as the asylum is built, suppose that the erection of it comes to 30,000 *l.*, the Lord Lieutenant, whenever he pleases, in Council, allocates, according to the beneficial interest which each county has in the asylum, the amount to be paid half-yearly by each of the counties, for the erection of the asylum. The rule is, that the order is made in the Privy Council. I shall suppose a case; the counties of Kilkenny, Carlow, and Wexford. Wexford, say, pays about one-half the expenditure for the erection of the asylum, inasmuch as the population there is equal to that of the other two counties; the expense in Wexford would then be 15,000 *l.*, whereas in the other two counties it would be 7,500 *l.* each, extended over 14 years, to be paid in half-yearly instalments in that proportion.

223. I am not asking as to the building of the asylum, but as to the preliminary steps necessary; you admit that each Order in Council and a publication of that order in the Gazette is necessary; I then ask you, is it not necessary that the grand jury should make a presentment previously to the Lord Lieutenant issuing any order; whether that should not be issued to the grand jury subsequently to the Order in Council?—Not at all.

224. Then how do you read that the grand jury shall make their presentment for the county or counties in such proportions?—Because the Lord Lieutenant sends down an Order in Council each half-year; that goes down each half-year to every grand jury; the Lord Lieutenant sends down to the grand jury an Order in Council to repay the money; even under the 1 & 2 Geo. 4, I think I am perfectly correct as to the 3d clause, because the 3d clause goes to this simple fact, that the grand jury are to present such sums as shall be notified to them by the Lord Lieutenant to present, and that is the meaning of the Act, that after

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the asylum is built, such sums of money as shall be notified to the respective grand juries shall be presented by them in the proportions stated.

225. Can you show me the words in the third clause?—Yes; take them on consecutively. Permit me to anticipate the third by reference to the second; look at the marginal note, which says, "Lord Lieutenant empowered to direct any number of asylums for the lunatic poor to be erected and established in several districts, consisting either of two or more counties, or of one county or town only." Then the third clause is assuming that the Lord Lieutenant has done that, and that the grand jury are to present such sums: "And be it further enacted, that at any time after such Order of Council shall be made and published in the Dublin Gazette" (that Order in Council being for the erection of the asylum), "it shall and may be lawful for the grand jury of any and every county, county of a city, and county of a town within any such district, or of which such district shall consist, at any assizes, to present such sum or sums of money, to be raised off such county, county of a city, or county of a town respectively, as shall be requisite for defraying the expenses of erecting and establishing such asylum, and for maintaining the same, to such amount and in such proportions as shall be directed by any order to be made by the Lord Lieutenant or other chief governor or governors of Ireland, by and with the advice of His Majesty's Privy Council in Ireland."

226. How could any grand jury make that presentment without knowing the estimate, or what the Lord Lieutenant considers would be the proper expense?—Simply in this manner: the Lord Lieutenant gets from the Board of Works, who are the body to expend the money, the total expenditure of the money in that district; as soon as he finds that, in Council, he allocates upon the different counties, or as to the districts, the proportions of the money that is to be paid by them in 28 instalments or 14 yearly payments; he allocates upon each county the sum it is to pay.

227. After the Order in Council, and before the erection of the asylums, was any presentment made by the grand juries that were interested in those asylums?—Never.

228. Is there not a certificate of completion of the asylum necessary before any sum can be levied on these counties?—Yes; the grand jury really and *bonâ fide*, by the Act of Parliament, know nothing whatever. I am not saying whether it is right or wrong; I am only stating the fact; but the grand jurors in Ireland and the ratepayers know nothing of the expenses of the asylum, or what they are doing there, until they are called upon to pay it.

229. You allow that they have not got any information?—Yes.

230. That they have, in point of fact, received no information?—None.

231. That they have received no certificate of the completion?—Who?

232. The different grand juries.—No, certainly not.

233. Are not certificates necessary after completion before any levy can be made?—That is a question of law, with which I have nothing to do.

234. But you are aware of that, are you not?—No. I know that practically it is not done; of course I am only speaking of the practice; I have nothing whatever to do with the law.

235. *Chairman.*] You do not consider yourself required by law to do so?—No, certainly not.

236. Mr. *Scully.*] Are you aware of how the original buildings were constructed in respect to the furnishing the estimates in the buildings erected under the old Act, the 1 & 2 Geo. 4?—Yes.

237. Are you aware of any case there, where the original estimate was sent down to the grand juries for consideration or information?—I cannot speak of that; they are paid for long since, and I am not aware.

238. You were not an officer at that time?—No.

239. You were not aware of anything of the kind occurring?—No.

240. No information was given to the grand juries in reference to the late erections previous to their building?—When the question of increased accommodation for the lunatic poor in Ireland had been mooted in 1843 and 1844 before a Committee of the House of Lords, my colleague (Dr. White) communicated with the Boards of Governors, personally and by letter, of all the asylums in Ireland, in consequence of the report of the House of Lords saying it was necessary to increase the asylums in Ireland, and that the accommodation could be given in one of three ways; namely, by erecting new asylums, by making additions to the old,

old, and by building one large asylum for epileptics. In consequence of that, the Lunacy Office put itself in communication with the various Boards of Governors of the lunatic asylums, who would be supposed to be more cognisant of the wants of the lunatic poor than any others; and they all recommended the new asylums, such as are now constructed. It was done with the full approbation and knowledge of the various Boards in Ireland. Every one of the new asylums were erected at their recommendation.

241. Was there any correspondence?—There was a very long official correspondence; I should also wish to make you understand this, that though the grand jurors are not all on the Board, every member of the Board is generally a grand juror; so far grand juries are represented at the Board. A committee of the grand jury at each assizes goes to visit the asylums and to report. Colonel Dunne was on the very last occasion at Maryborough when the Committee reported upon the state of the lunatic asylum.

242. The governors are not elected by the ratepayers?—No.

243. But they represent the ratepayers generally?—I should think that, being gentlemen of rank, position, and fortune, if they do not represent them I do not know who would do so.

244. Do you consider their present mode of formation a proper one?—It is the only one that at present can be under the Act of Parliament, but I dare say it might be improved.

245. How many are there in each district?—They vary with regard to the size of the district. I dare say in the Cork Asylum there are about 40 or 44; I think the number is 44.

246. How far do they live from the asylum?—The manner in which they are generally regulated is this: they get four or five of the principal gentry who live near the asylum in order that they may frequently attend; they are taken from different parts of the county to respresent different districts.

247. All the estimates for the sustenance go through their hands, do they not?—Yes.

248. Do the Board of Governors meet often?—The Board of Governors meet once a month, and in Dublin we meet once a fortnight, and then in addition to that there are special meetings.

249. They have the control and management of the expenditure of the asylum?—Yes.

250. Do they pay the salaries of the superintending officers?—Yes.

251. Do they appoint them?—No.

252. Who does appoint them?—The Lord Lieutenant.

253. They are responsible to the governors?—Yes; they are the servants of the governors, although they are appointed by the Lord Lieutenant.

254. Have the Board of Governors the power of dismissing them?—If there is a sufficient reason, of course they would be dismissed.

255. *Chairman.*] But who does dismiss them?—I am very happy to say that we have never had occasion to dismiss any of them.

256. Who would have occasion to dismiss the superintendent?—The Board.

257. The establishment generally, under the superintendents, may be dismissed by the Board of Governors?—Yes.

258. Or has the superintendent himself the control and dismissal of them?—Subject to the approbation of the Board of Governors; a resident physician may suspend a servant.

259. Is the superintendent of an asylum in all instances a physician?—Yes, in every instance, except two in Ireland; in all late appointments physicians have been selected.

260. What are those two to which you refer?—One is Armagh, the other is Ballinasloe, the former gentleman has been there since the erection of the asylum

261. Is he not a professional man?—No; we have no retiring pensions; he is a very efficient man, and we do not like to supersede him; there is a visiting medical officer as well.

262. Mr. *Scully.*] You were speaking of Clonmel as a place where land was taken?—Yes.

263. What was the price of that?—Probably 2,000 *l.*

264. How much land was taken?—I believe 18 or 20 acres.

265. At what rate was that purchased?—I do not exactly know; I think land sets there near 8 *l.* an acre.

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266. How many years' purchase?—They purchased by inquisition; there is a committee or jury sworn; they value the ground, and the Board of Works purchase it; they offer so much to the proprietor, and if the proprietor does not think it is fair, they have the power of compelling any man to sell his ground.

267. At any price?—At any price that is considered fair; if they disagree a jury is sworn.

268. How much land did you take for Kilkenny?—I really forget; I think it was about 26 or 28 acres.

269. How much an acre was paid for that?—I do not know; I had nothing to do with it.

270. Was that done by the Board of Works?—Yes.

271. You were practising before your appointment as a doctor?—Yes.

272. As to the idiots and imbeciles, how many in proportion to the number in Ireland go into the asylums?—I do not know; if I had known you intended to ask these questions, I should have prepared myself.

273. It is important to know that, because these asylums have been built in a great measure for imbeciles as well as lunatics, and I see in a report of 1852 or 1853, that one-fourth or one-fifth of the entire number in the asylums are idiots, imbeciles, and epileptics?—Yes.

274. Do you consider that a proper course?—Asylums are built for those who are mentally affected, and it is a very nice thing to draw a distinction; some imbeciles are most necessary to be kept up; they are very violent and dangerous, and so are many of the idiots.

275. Mr. *Fagan.*] You know those ventilating towers in the Asylum in Cork, do you not?—Yes, I do.

276. Did you examine into the efficiency of those for the purposes of ventilation?—I do not like the general construction of the Cork Asylum; I told you that candidly before, and if you recollect, the staircase to the physician's rooms was so badly ventilated, and so narrow and so abrupt, that there was a necessity of altering it subsequently, by changing the stairs.

277. But I wish specially to direct your attention to these towers; did you examine whether those were efficient for the purposes of ventilation?—I think they were fair enough; they might have been better, but still I do not think you have any reason to complain of them.

278. Was your attention specially directed to that matter?—Yes; I know that objections have been made to them, but they could be very easily remedied, with very little trouble and expense.

279. In your judgment, is the music hall there of any use?—Of course it is an expense, and I think it is a useful thing. You will find them in all the great asylums in England.

280. But to what use has that music hall been applied in Cork?—Although it has not been employed to any great effect, that is no objection to its existence.

281. Are you aware that, per head, the Cork Lunatic Asylum has cost considerably more than any other of the seven?—No; I do not think it has.

282. You are not aware of that?—No.

283. Captain *Duncombe.*] Is the Cork Asylum full now?—There are about 60 or 70 vacancies; it was built for 500, and there are about 430 or 440 in it.

284. *Chairman.*] Is it your practice in Ireland always to keep a certain number of beds vacant?—Yes, as much as possible.

285. For cases of urgent necessity?—Yes.

286. Or contagious diseases breaking out?—Yes.

287. Mr. *Macartney.*] Have you the Order in Council for Kilkenny?—Yes.

288. Will you produce it?—Yes (*the Witness produced the same*).

289. That is dated when?—The 30th day of December.

290. Of what year?—1846.

291. Was there any further order made when the house was completed?—No, none whatever.

292. When was Killarney completed?—It was completed in 1854.

293. Was there a plan submitted to the inspectors for their approval previous to any commencement of the works?—Oh, yes; the Board of Works submitted, for

for the inspection of the inspectors, a general sheet; more as to the sanitary point of view, more as to the division, the structural expenditure.

294. But no complete plans were submitted?—Yes, the ground plans, on paper, were submitted, as to the width of corridors.

295. Then no other plans than the ground plans have been submitted to the inspectors?—Yes, the plans.

296. Do you mean the plans for the elevation?—We have always approved of three storeys, because we thought it more economical, though two storeys are better.

297. Killarney in 1854 was finished?—Yes.

298. Was there a Board summoned for the purpose of meeting you, to take that building into charge, and to put the parties into it?—Yes.

299. What date was that?—I cannot tell you.

300. You do not know that?—No.

301. Was any Order in Council made subsequently, apportioning that expense, and showing the annual instalment to be repaid by the different counties?—No, I am not aware.

302. And that has never been published?—No.

303. Do you know the sum total that was expended on Killarney?—It is stated in that return 33,000 *l.*

304. Was that the principal amount intended to be expended on that asylum?—I have already told you that there were no estimates sent in.

305. No estimates at all?—No.

306. Then how did you arrive at the estimate for Cork for the shell?—That was mentioned casually in one of the returns; there was also a rough estimate made for the New Richmond.

307. Has there been any Order in Council for a presentment with respect to Killarney?—Yes.

308. At the spring assizes?—Yes, all through, from the beginning; for maintenance and current expenses.

309. That has been complied with?—Yes.

310. Will you state when Kilkenny was opened?—About two years since.

311. That is 1853?—Yes.

312. When was the Order in Council for erecting that published?—Kilkenny was the 29th day of June 1847.

313. You say that the completion was in 1853?—Yes.

314. Then that house has been opened for the reception of lunatics a couple of years?—Yes.

315. And the Board were constituted governors, and took charge of the house?—Yes.

316. Upon the proper certificate?—Upon the usual certificate that the house was complete.

317. The presentments for the maintaining, in accordance with the subsequent statutes, have been paid by the Government in the first instance, and subsequently repaid by the grand jury, by Orders in Council?—Yes.

318. What is the amount paid by Order in Council for Kilkenny?—None whatever.

319. The whole expenditure is, what amount?—£. 24,000 up to the 7th of March 1845.

320. For the erection of Kilkenny the whole of that amount has been advanced without any Orders in Council?—There have been Orders in Council for 7,000 *l.*, and issues by the Treasury, 17,000 *l.*

321. You stated to me just now that there were no Orders in Council for Kilkenny?—I thought you said the Orders in Council for the repayment back again.

322. You said that there were no Orders in Council sent down for the repayment?—None.

323. I asked you what amount of expenditure was advanced?—£. 7,000.

324. And the difference?—£. 17,000.

325. Where was that from?—From the Treasury.

326. Now, for Omagh, when was the Order in Council issued?—September 1847.

327. Have you it there?—Yes (*the Witness produced the same*).

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328. What is the date of it?—7th September; passed and given at a Council on the 13th day of December 1847.

329. When was that house completed?—About two years since; it has been occupied about two years.

330. Was there any Order in Council made after the completion, for any portion of the repayment?—None.

331. What was the amount expended upon that?—£. 41,300.

332. Was any portion of that advanced upon Orders in Council?—£. 13,000.

333. And the balance?—£. 28,000.

334. From where?—The Treasury.

335. Without Order in Council?—Yes.

336. In what year was the Order in Council for Sligo?—17th April 1847.

337. When was the house completed?—About two months ago.

338. 1855?—Yes.

339. And no subsequent Order in Council to the grand jury after completion?—No.

340. What amount has been advanced upon Orders in Council?—£. 14,700.

341. How much without?—£. 18,300.

342. Has a Board of Governors been constituted?—Yes.

343. And they are in possession of the house?—Yes.

344. And there are inmates in the house?—Yes.

345. And advances have been made, by Orders in Council, for the maintenance of those inmates?—Yes.

346. And no presentment return has yet arrived from the grand jury?—No.

347. Now, when was Mullingar completed?—The same year.

348. When was that completed?—It is not taken off their hands yet; it is finished.

349. Has there been any Order in Council for the repayment in that instance?—None.

350. What amount was advanced by Orders in Council for the building?—£. 18,000 by Orders in Council, and 8,000 *l.* from the Treasury.

351. That is, 8,000 *l.* without the proper Orders in Council?—Yes.

352. Then the next section are the three additions?—Yes.

353. Where those additions upon memorial?—Yes.

354. From the Governors?—Yes.

355. Was any communication made to the Governors acceding to the request?—Yes, there were.

356. For the additional accommodation required, was any amount stated as to what the probable expense would be that would be put upon the county by the Governors or by the Government?—I think in building there was.

357. Can you charge your memory with the amount?—I should not like to do that. I think about 18,000 *l.*

358. The works are in progress?—Yes.

359. When are they likely to be finished?—I should hope this year.

360. Are they not under the surveillance or inspection of the county surveyor there?—Yes, Mr. Lanyon; he is the architect under the Board of Works.

361. How soon will these works be finished?—About August.

362. Was there an Order in Council to authorise the expenditure of that addition in pursuance of the subsequent Act of Parliament?—Part of the money advanced was for the purchase of the ground, but the building has been reclaimed by Government.

363. And is in course of repayment?—Yes.

364. Upon the usual presentment by the grand jury after an Order in Council?—Yes.

365. These buildings will amount to the sum of 18,000 *l.*?—I think so.

366. Has everything been done regularly, so that when completed an Order in Council can issue for the repayment of the money?—The original Order had not been gazetted.

367. It was made after the additions, but not gazetted?—Not gazetted.

368. The

368. The next addition is Ballinasloe?—Yes.

369. Was there an order in that case?—There was.

370. Was it gazetted?—No.

371. Can you say what the amount of the addition was?—Altogether, I should say 17,000 *l.*

372. When will that be completed?—It is completed now.

373. And in the occupation of the inmates?—Yes.

374. In that case has an Order in Council been made for the repayment of the money?—No.

375. Upon what ground?—I cannot tell that.

376. The third is Clonmel?—Yes.

377. Was there an Order in Council for that?—Yes; but it was not presented.

378. Was it published?—No.

379. Was that at the request of the governors?—Yes.

380. Is that completed?—It is.

381. The money has been advanced upon an Order in Council?—Yes.

382. Was no Order in Council made for the repayment?—No.

383. Now we come to the two final ones?—I beg pardon, the amount was 4,290 *l.*, upon which 900 *l.* was paid.

384. Upon what document or proceeding was that?—An Order in Council for the repayment.

385. To the grand jury?—Yes.

386. That should embody the whole expenditure, and be apportioned in instalments?—So it was; but Clonmel only belongs to one county, and therefore there was no necessity.

387. There are two incomplete yet?—You have not said anything of the Richmond.

388. That is for how many counties?—For the county of Dublin, Louth, Wicklow, and the city of Dublin.

389. Is any money repaid?—No; inasmuch as we are going to separate the county Meath from the district when the Mullingar is opened.

390. In the mean time the lunatics have been sent to Richmond?—Yes.

391. And the counties have regularly paid their proportions?—Yes.

392. What is the amount of the additions to Richmond for these new buildings?—Altogether about 35,000 *l.*

393. Is that the sum which is now sought to be charged upon the different counties?—The sum stated here is 36,000 *l.*; but I should think it would require 3,000 *l.* more to finish it.

394. That would be 39,000 *l.* for the Richmond?—Yes.

395. Can you say what the value of the building will be?—I cannot say what it will cost; probably some 60,000 *l.* is the value of the old establishment; it may have cost so much.

396. Has any Order in Council been passed for the repayment of that sum?—It is not finished yet.

397. In the case of Richmond, like the others, you want the original publication in the Gazette of the Order in Council?—No; there was a publication in the Richmond case.

398. Then all is regular in the Richmond?—Yes.

399. Until the work is finished?—Yes.

400. And then it can be regular by making the Order in Council allocating, and so on?—Yes.

401. Then that completes the whole of the buildings now in operation?—Yes, I think so.

402. Mr. *Fagan.*] Was the Lord Lieutenant at all consulted with reference to this expenditure of money?—He was not aware of it.

403. The money was obtained from the Treasury; and the expenditure went on, and the Lord Lieutenant in Council knew nothing of it?—That is the case.

404. Sir *J. Duckworth.*] I presume the sums stated in the first column are the total cost of the erection?—Up to that date, but some of them are going on still.

405. Take Cork, for instance; it is stated in the first line, that the cost is 82,000 *l.*?—Yes. I believe there are some outstanding debts; that is the money expended; that is the total amount of the money advanced.

Dr. *John Nugent.*

4 May 1855.

406. In the demand made under these Acts of Parliament on the counties, is there any sum charged for interest on money advanced?—No interest at all.

407. Simply the amount expended?—And diffused over a certain number of years without bearing interest.

408. Without bearing any interest at all?—Yes.

409. Mr. *Fagan.*] The law does not require the grand jury to be at all consulted with reference to the expenditure?—No.

410. The only protection the ratepayers have, is the Order in Council under the Lord Lieutenant?—Yes; the protection they have is the Order in Council.

411. And that protection was not afforded in reference to this last expenditure?—No.

412. Mr. *E. Denison.*] You say the only protection to the ratepayers is the Order in Council; what protection to them is that?—I am not aware that it is any.

413. Mr. *Scully.*] If the Lord Lieutenant choose to spend 60,000 *l.* instead of 30,000 *l.*, there is no limit to his authority?—No.

414. There is no power in the ratepayers to prevent it?—No.

415. *Chairman.*] Is the term of 14 years still persevered in?—No; because in the last case in which it was claimed, they did it in four years, but that was for the purchase of ground attached to the asylum; they made it payable in four years; in eight half-yearly instalments.

416. That was for extending the ground?—Yes.

417. Without buildings?—Yes; because they had the beneficial interest in the ground at once.

MINUTES OF EVIDENC

TAKEN BEFORE THE

SELECT COMMITTEE

ON

LUNATIC ASYLUMS (IRELA (ADVANCES) BILL;

WITH THE

PROCEEDINGS OF THE COMMITTEE

(*Colonel Dunne*).

Ordered, by The House of Commons, *to be Prin*
24 *May* 1855.